FACULTY OF BUILT ENVIRONMENT

Forward

The Faculty Courses Handbook contains all the subjects and syllabi offered in the Schools in the Faculty of Built Environment.
The School of Architecture and Construction Management offers two programs. Architecture under a 3+2 model with a 3-year undergraduate Bachelor in Architecture and, a 2-year postgraduate Master in Architecture totaling 5-year studies. The Construction Management offers a 4-year undergraduate Bachelor in Construction Management and an 18-months postgraduate Master in Construction Management.
The School of Surveying and Land Studies offer three (3) programs. Surveying; Land Studies; and, Geographic Information System (GIS). Each program also offers a 4-year undergraduate Bachelor degree programs in Surveying, Land Studies and Geomatics, as well as, offering three (3) different post graduate Master Programs. The course content, syllabi, and the program duration are as inscribed in the Handbook.
The schools also offer Master of Philosophy and Doctor of Philosophy by research in all the programs offered.
All the content and syllabi of the taught programs in the schools are inscribed in the Faculty Courses Handbook reflecting various study duration subjects and syllabi in each level of study.
The University enforced a 4-subject semester policy in 2020 to streamline program benchmarking and accreditation requirements. This is reflected in the Handbook for each of the above programs, nonetheless, there are provisions for the inclusion(s) of elective subjects as prerequisites for some program benchmarking and accreditation requirements. This is obvious in the Architecture Program, where there are electives offered in the final two semesters of the 3-year bachelor program, and, in the first-year master program which also has one elective each in each semester.
The courses, and syllabi are subject to contentious working-reviews with feedback from industry on graduate performance, and internal subject-related assessment in the two Schools, as and when necessary. It is suggested that, a one-cycle-delivery and, assessment timeline for minor update review-revisions for optimal performance to enable credible currency of syllabi and course-content.
The faculty and staff are committed to newer developments and changes; thus, the Handbook is a guide to faculty membership, students, community, industry and, other interested viewers.
Thank you for taking the time to review what is inscribed in this Handbook. At the Schools and Faculty, we are sure to give another update is the future with needed refits, and along with newer additions as learning in keeping with knowledge evolution(s).

Cletus K. Gonduan (PhD)
Professor and Dean of Faculty – Faculty of Built Environment

Dean of Built Environment

- **Professor Cletus K. Gonduan**, PhD. AITA (JCUni.) Australia), M. Infrastruktur Plannug & Ing. Universitat Stuttgart, Germany, PGDipl. T&CP Sydney University, PGCert. (MLF ETI Washington), Bach. Arch. (PNGUoT), FLPNGIA, Registered Architect

SCHOOL OF
ARCHITECTURE AND CONSTRUCTION MANAGEMENT

SCHOOL OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

Head of School

- **Dr. Jerry J. Walliah**, PhD (QUT, Australia) M.Mgt. (PNGUNRE), PGDipl.Edu. (DWU) Bach. Bldg. Dipl. Bldg. (PNGUoT)

Deputy Head of School

- Clive Paigala. M.Mgt. (PNGUNRE), PGDipl. TVET (Goroka Uni.), Bach. Arch (PNGUoT).

<u>Architecture</u>

Professor

- **Professor Cletus K. Gonduan,** PhD. AITA (JCUni.) Australia), M. Infrastruktur Plannug & Ing. Universitat Stuttgart, Germany, PGDipl. T&CP Sydney University, PGCert. (MLF ETI Washington), Bach. Arch. (PNGUoT), FLPNGIA, Registered Architect

Senior Lecturer

- **Dr. Andrew C. Sariman,** PhD AITA (JCUni. Australia), MSc. Const. Mgt. (Heriot Watt University -Scotland), PGDipl. Bldg. Science Sydney University Australia, Bach, Arch & Bldg (PNGUoT), MPNGIA; Registered Architect.
- **Dr Raheleh Rostami,** PhD Postdoctoral. UTM Malaysia, PhD. UTM Malaysia, Continuous Master. Kerman IAU, Iran, Iran Engineering Board, Registered Architect (Grade1)

Lecturers

- **Dr. Winter Petilani,** PhD AITA (JCUni. Australia), MArch. (Architecture University of Wellington NZ), BArch (PNGUoT). MPNGIA) Registered Architect.
- **Davida Thomas,** MPhil. (PNGUoT), B.Arch. (PNGUT) MPNGIA
- **Clive Paigala**, M.Mgt. (PNGUNRE), D. PVTE. (Goroka Uni), BArch. (PNGUoT),

<u>Construction Management</u>

Senior Lecturer

- **Dr. Jerry J. Walliah**, PhD (QUT, Australia) M.Mgt. (PNGUNRE), PGD Edu. (DWU), B. Bldg., Dipl. Bldg. (PNGUoT).
- **Dr. Meysam Khoshnava**, PhD, Postdoctoral of C.M (Civil Engineering-UTM) Malaysia); PhD & Master of C.M (Civil Engineering-UTM) Malaysia); Bach. of Civil Engineering (IAU, IRAN); Registered Iranian Construction Engineering Organization

Lecturers

- **Ken Polin M. Const.Mgt**. (UNSW- Aust.), PGDipl. Const. Mgt. (University of Manchester, UK), B. Bldg. (PNGUoT).
- **Mathew Pomoso, M.Mgt**. (PNGUNRE), PGD. Edu. (Goroka Uni.), B.Bldg. Dipl. Bldg. (PNGUoT),
- **Magdelyne Kuluwah,** MSc (Proj. Mgt.) (Curtin University), PGCSCT (PNGUoT), B. Bldg. (PNGUoT), Dipl. Bldg. (PNGUoT).

Principal Technical Officer

- **Daniel Ame,** PGCSCT (PNGUoT), BArch. (PNGUT),

Administrative Officer

- **Veronica Michael,** BArts (UPNG), Cert. Library & InfoSc. (PNG Admin. College) Cert. Office Mgt. (PNGUoT), Cert. Debt. Recovery (PNGUoT)

Technical Officers

- **Rodney Wahune,** Dipl. Bldg. (Lae Technical College)

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- **Martin Kundi** Certificate in Building, (St. Joseph Technical College Lae)

Executive Secretary

- **Anita Kami,** Cert. Secretarial Studies (Lae Technical College)

Executive Assistant

- **Elizabeth Noriba** Diploma Human Resources Management (International Training Institute)

Janitor

- **Ekim Maminam**

Degree Programs

The School of Architecture and Construction Management is made-up of two academic study programs; A three-year Bachelor in Architecture program leading to a two-year Master in Architecture. A four-year Bachelor in Construction Management leading to a one-year Master in Construction Management.

Each Program is designed and is built-in with relevant competencies and benchmarking attributes. Both academic programs commence in the selected disciplines in the first year. Both programs will be sharing some common subjects throughout the undergraduate programs reflecting the industrial workplace. Specific profession-based subject deliveries, with relevant subject and profession competencies are streamlined into the respective Master Degree programs.

Entry requirements (any one of the following):

i) **Architecture:** Grade 12 School Leavers: SAT-P Test Score, Minimum of B grades in physics, Maths A plus A grades and B grades Physics, Geography, Language and Literature or Applied English.
ii) **Construction Management**: Grade 12 School Leavers: STAT_P Test Score, Minimum of B grades in, Maths A, B grades in physics and B grades in either Language and Literature or Applied English.
iii) All non-school leavers entering into both programs: as in school leaver requirements except that upon acceptance with the minimum requirement will do entry exams instead of STAT-P test.
iv) Diploma Certificate from Polytechnical Institute with Credit grades in science related subjects are invited to do entry exams before entry.
v) Diploma from other universities will be selected on a case-by-case basis.

The School also offers postgraduate degrees. It offers a two-year Master of Architecture, a one-year Master in Construction Management, plus an extended 6-months of a research-component Master in Construction Management for those interested in research undertaking, Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) by research in both and related research/study fields.

Entry requirement for a Master of Architecture and, the Master of Construction Management are screened through the University's postgraduate entry requirement of a minimum of:

a) 65% weighted average aggregate score of all undergraduate subjects and, an industry competency requirement of a;
b) 65% minimum pass requirement for the major capstone projects undertaken in the undergraduate program.

A Master of Philosophy is offered to candidates who have had substantive interest in research and, who had scored above average grades from a recognized university. Candidates pursuing a PhD program must have either a Master of Philosophy, or a Master of Science degree with acceptable experience in industrial-research engagement. A qualifying bridging program is required for those candidates who have a Master Degree in Architecture, Construction Management or other relevant Master Degree.

COURSE STRUCTURE
BACHELOR OF ARCHITECTURE

First Year First Semester

Code	Subject	Contact Hours	Credit
AR 110	Introduction to Architecture	10	21
AR 111	Computer Aided Design	10	21
AR 119	Introduction to Research in Arch & Const. Mgt	10	21
AR 117	Building Science	7	19
		37	**63**

First Year Second Semester

AR 120	Architectural Design II	10	21
AR 121	Digital Architecture	10	21
AR 122	Vernacular Arch. & Bldg. Traditions	10	21
CM 124	Construction Economics I	7	19
		37	**82**

Second Year First Semester

Code	Subject	Contact Hours	Credit
AR 210	Architectural Design III	10	21
AR 212	History of Architecture	7	19
AR 214	Structures	10	21
AR 213	Building Systems I	10	21
		37	**82**

Second Year Second Semester

AR 220	Architectural Design IV	10	21
AR 223	Building Systems II	10	21
AR 272	Architecture Theory	7	19
AR 222	Modern Architecture	7	19
		34	**80**

Third Year First Semester

Code	Subject	Contact Hours	Credit
AR 310	Architectural Design V	10	21
AR 312	Melanesian Built Environment	10	21
AR 316	Urban Development	10	21
AR 317	Ecological Sustainable Development	7	19
AR 319	***Architectural Research (Elective I)***	*10*	*21*
		47	**103**

Third Year Second Semester

AR 320	Architectural Design Integration Capstone Project VI	10	21
AR 326	Urban Design Theory	10	21
AR 327	Green Architecture	7	19
AR 328	Intro. to Arch. Practice and Mgt.	10	21
AR329	***Architectural Research (Elective II)***	*10*	*21*
		47	**99**

Relevant Rules, Policies and Guides
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Relevant Unitech Policies

1. Principles and Guidelines for Student Assessment
2. Summary of Examination Regulations 1026
3. Procedure for Compiling Examination Results
4. Procedure for Releasing Examination Results
5. Cheating in Assessment Items

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Graduate Statement (GS)
Bachelor of Architecture graduates are capable of designing, documenting, procuring and managing the delivery of simple to medium range architectural projects. They are able to contribute to design and integrate technology in such projects. They understand social, cultural, economic, and environmental challenges related to architecture and the built environment in a sustainable manner.

Course Learning Outcomes (CLOs)
Architectural courses of study must be balanced between the theoretical and practical aspects of architectural training and shall ensure that the graduate on completion of the course the student will:

CLO 2	Demonstrate personal and professional skills including communication across multiple mediums, personal effectiveness, problem-solving, and teamwork (including working with other disciplines and non-professionals;
CLO 3	Possess the knowledge of the history and theories of architecture and the related arts, technologies and human sciences and their influences on quality of architectural design;
CLO 4	In-depth knowledge of urban design, planning and the skills involved in the planning process including achieving environmentally sustainable design;
CLO 5	An understanding of the relationship between people and buildings, and between buildings and their environment, and of the need to relate buildings and the spaces between them to human needs and scale with adequate knowledge of the means to produce safe environments accessible to people of varying physical and mental abilities;
CLO 6	An understanding of the project management with a focus on structural design, construction and engineering problems associated with achieving design outcomes within whole of life costs;
CLO 7	An understanding of the profession of architecture and the role of the architect in society, in particular, in preparing briefs that take account of social factors;
CLO 8	The design skills to meet the requirements of clients and building users within the constraints imposed by environmental conditions, cost factors and building regulations;
CLO 9	A knowledge of the industries, organizations, regulations and procedures involved in translating design concepts into buildings and integrating plans to overall planning;

AR110: INTRODUCTION TO ARCHITECTURAL DESIGN 1

Course(s)	Bachelor of Architecture (NQF Level 8)
Subject Name	Introduction to Architectural Design I
Subject Code	AR 110
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	**21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]**
Delivery Mode	On campus
Prerequisites	Grade 12 'A' Entry
Co-requisites	None
Subject Coordinator	Design Studio Master

Synopsis

To provide an orientation for beginners into the field of architecture, the tools of trade that enable the student to explore and develop the ability for self-expression through creative explorations of architectural form and space in two- and three-dimensional expressions. Simple whole and parts of product (building) typologies, and observed through creative exercises on designing with solids, voids, planes, frames, textures, art of composition, rendering, freehand-sketches and colours by using a variety of graphic, craft, sculptural and model-making media, and in combination with an introduction to manual and digital drawing and perspective for small to medium scale building types. Orientate students to other interconnected relationships to related built environment professions and applications. Developing awareness and understanding on the role of architects and other related building professionals in the design and construction and making visits to construction sites, architects and building contractors offices.

Subject Topics

1. Drawing; the language and vocabulary in architecture:
2. Product design and fabrication
3. Design as a principle Design Tool in Architecture
4. Interpretative Representation
5. Design & Socio-cultural, Socio-economic & environmental considerations
6. The Role of an Architect

Subject Outline

Topic	Content
1. Drawing; the language and vocabulary in architecture:	1.1 Line work; 1.2 Dimensioning; 1.3 Scales, lettering; 1.4 Orthographic, isometric axonometric projection, 1.5 Composition and different 3D perspectives types. 1.6 The art of composition and Technology
2. Product design and fabrication	2.1 The element and composition of a product (Bauhaus Movement). 2.2 The Design as a creative tool of communication. 2.3 The design of a product and technology 2.4 Product art composition and fabrication
3. Design as a principle Design Tool in Architecture	3.1 Design Communication in Architecture 3.2 The appreciation of Design as a tool for communication in spatial progression history and theory of architecture
4. Interpretative Representation	4.1 Interpretative representation of Building as an Object of Creation. 4.2 Design Creativity – Manual and/or Digital Production
5. Design & Socio-cultural, Socio-economic & environmental considerations	5.1 Design as a tool to understand the integral socio-cultural, socio-economic and environmental relationships in architecture

6. The Role of an Architect	6.1 The professional and social responsibility of an architect as a designer in the construction industry and to society.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate foundation skills in reading and interpreting and basic application of architectural drawing vocabulary, measuring, and designing/drawing to scale, and designing and making practical objects;
2. Develop and articulate three dimensional visualizations of geometrical forms and creative integration, graphical communication presentation, manually and with CAD technology.
3. Demonstrate the ability of preserving interactive arrangement of architectural forms and shapes that creates evolving ideas of creative space, spatial relationships and design interpretation.
4. Design and draw in 2D and 3D production of objects manually and with the aid of digital design software.
5. Show and develop an aptitude for architecture and its relationship to other related disciplines.
6. Develop the knowledge-base on the integral connectivity to other design development players in the built environment.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 50% overall, 30% for the Final Project and 20% for the semester portfolio must be achieved. There is no final examination in this subject.
Students must also refer to the Subject Assessment Details.

- **Project (25 %)**
- **Project (25%)**
- **Final Project (40%)**
- **Semester Portfolio (10%)**

Assessment 1 - **Project 1.0** The demonstration of the knowledge base on the architectural representation and presentation vocabulary in measuring, and designing/drawing to scale, and designing and making practical objects as determined in the architectural studio.

Assessment 2 - **Project 2.0** An Individual based design project in response to the project brief designed and rubric criteria in achieving design proficiency as a communication tool in architectural production in design, creativity and in promoting good architectural designs for client need and architectural responsibility to the public.

Assessment 3 - **Final Project.** A final architectural design project and presentation outlining and communicating the design processes, rationale, outcomes and in meeting the rubric criteria in a choice of manual or digital production format

Assessment 4 - **Semester Portfolio.** A compilation of all projects carried out in the semester in an A1 portfolio by each student.

Subject Text book
- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.

References

- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide

AR111: COMPUTER AIDED DESIGN (CAD)

Course(s)	Bachelor of Architecture (NQF Level 8)
Subject Name	Computer Aided Design (CAD)
Subject Code	AR111
Duration	13 teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	21 [(4.2x2) + (2.2 + 2) + (1.4 x 6)]
Delivery Mode	Lectures
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

Developing introductory or basic and intermediate skills in the use of architectural design and drafting software with the assistance of computer aided design (CAD) tools. CAD is now a widely used tool that allows for the easier development of architectural design and design management integration. Students will be allowed to work with basic CAD tools that will prepare them to grasp the principles of 2D drafting and 3D drafting with the use of selected CAD software.

Subject Topics

1. Introduction to CAD and Terminologies
2. Drafting Concepts of CAD software
3. Basic Concepts in 2D CAD Application
4. Intermediate Concepts in CAD Application
5. Advance Concepts in CAD Application
6. CAD Animation and Application

Subject Outline

Topic	Content
1. Introduction to CAD and Terminologies	1.1 Why CAD in Architecture? 1.2 What is Computer Aided Design (CAD)? 1.3 Setting Up CAD software on a Personal Computer (PC) and computer requirements. 1.4 Basic CAD Software User Interface and CAD Terminologies.
2. Drafting Concepts of CAD software	2.1 Comparison between Manual Drafting and Digital Drafting in Architecture. 2.2 CAD as a tool in Design. 2.3 Drafting in CAD and Basic User Commands.
3. Basic Concepts in 2D CAD Application	3.1 What is two-dimensional (2D) Drafting? 3.2 2D Drafting in CAD and Basic User 2D Commands. 3.3 Exploring 2D Commands in CAD.
4. Intermediate Concepts in CAD Application	4.1 Understanding 2D Editing tools and Modify CAD Commands 4.2 Exploring 2D Editing Concepts and their Application to Architectural CAD.
5. Advance Concepts in CAD Application	5.1 Understanding 3D Editing tools and Modify CAD Commands. 5.2 Exploring 3D Editing Concepts and their Application to CAD Projects.

6. CAD Animation and Application	6.1 Understanding 3D Animation Editing and Modify CAD Commands Application of 3D CAD Animation Editing and their Application to CAD Projects.

Subject Learning Outcomes (SLOs)

On completing the subject, the student should be able to:

1. Undertake CAD terminologies;
2. Use CAD Commands to do Architectural Drafting.
3. Demonstrate competency in selected CAD Software
4. Work with architectural design and selected CAD drafting software;
5. Produce 2D Architectural Documentation
6. 3D architectural presentation.

Assessment Tasks and Weightings

The assessment for this subject is a continuous assessment worth 100%,

To obtain a pass grade in this subject, a 50% overall must be scored from the total weighting of 100. An assessment guide is given below:

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (10%)**
- **Assignment 2 (10%)**
- **Test 1 (20%)**
- **Project 1 (20%)**
- **Project 2 (40%)**

Assessment 1 - **Assignment 1:** CAD terminologies and Concepts in CAD Drafting;
Assessment 2 - **Assignment 2:** Advance Concepts in CAD Drafting Exercises
Assessment 3 - **Test 1:** Concepts in CAD as an Application
Assessment 4 - **Project 1:** Application of 2D CAD Concepts
Assessment 5 - **Project 2:** Application of 2D and 3D CAD tools

Subject Text book

- Aouad, G. (2012) Computer Aided Design Guide for Architecture, Engineering and Construction, Routledge Publication, United Kingdom.
- Brightman, Michael (2018), The SketchUp Workflow for Architecture: Modelling Buildings, Visualizing Design, and Creating Construction Documents with SketchUp Pro and Layout, 2 edition Wiley Publication, New Jersey, USA.
- American Institute of Architects (2016), Architectural Graphic Standards (Ramsey/Sleeper Architectural Graphic Standards Series), 12th Edition, Wiley Publication, New Jersey, USA

References

- Selected CAD Software Manuals

AR 119 Introduction to Research in Architecture and Construction Management

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Introduction to Research in Architecture and Construction Management
Subject Code: AR 119
Duration: 13 teaching weeks
Contact Hours: 6 [*2hrs Lectures + 2hrs Tutorials + 2hrs Project*]
Credit Points: 15 [(2x4.2) + (2x1.4) + (2x2.1)]
Delivery Mode: Lectures
Prerequisites:
Co-requisites:
Subject Co-ordinator:

Synopsis:
This subject introduces the main concepts of research in Architecture and Construction Management. It offers firm basic understanding of producing good research proposal and on how to undertake research successfully. This subject is structured systematically to meet the aim of producing good research proposal through the understanding of the concept of research, different classifications of research, theories and paradigms, various research styles, quantitative and qualitative approaches and to know where to begin research. The subject sessions will be made up of lectures, in class discussions, exercises and projects on the concept and approaches of research in construction necessary to achieve the subject aims.

Subject Topics:

Themes:	**Topic Details:**
1. Concept of research	1. Research: A careful search and investigation 2. Research: Contribution to knowledge 3. Research: A learning process 4. Contextual factors affecting research
2. Classifications of research	a) Pure and applied research b) Quantitative and qualitative research c) Other categories of research
3. Theories and paradigms	a) Development of knowledge b) Testing a theory c) A paradigm d) Positivism e) Interpretivism f) Models and hypotheses
4. Research styles	a) Action research b) Ethnographic research c) Surveys d) Case studies e) Experiments
5. Quantitative and qualitative approaches	a) Quantitative approaches b) Qualitative approaches c) Triangulated studies d) Data sources
6. Research methodology	a) Research topic selection b) Refining research topic c) Developing research proposal

Subject Learning Outcomes (SLO):
Upon completion of this subject, students will be able to:
1. Understand general concept of research in Architecture and Construction Management.
2. Understand various classifications of research and its application to Architecture and Construction Management
3. Understand theories and paradigms of research in Architecture and Construction Management.
4. Understand different research styles and strategies in Architecture and Construction Management.
5. Understand Quantitative and qualitative research approaches in Architecture and Construction Management.
6. Understand the Research Methodology in Architecture and Construction Management

Assessment Tasks and Weightings:
The assessment for this subject is a continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. There is no final examination in this subject.
Unit assessment consists of one (1) Test, two (2) Assignments and one (1) Project as shown below.

Assessable Tasks		**Assessment Descriptions**	**Weightings**
1	Assessment 1 (Assignment 1)	This will be an individual student assignment which requires the student to identify and classify different types of research, theories and research styles. The assignment is assessed by an assessment rubric and contributes 10% towards the final grade for the subject	10%
2	Assessment 2 (Test 1)	This will be an individual student test which test the student of the level of knowledge learnt from Topic themes; Concept, Classification, Theories and paradigms of research. The Test contributes 25% towards the final grade for the subject.	25%
3	Assessment 3 (Test 2)	This will be an individual student test which test the student of the level of knowledge learnt from Topic themes; Research styles, Quantitative and qualitative approach, and Research methodology. The Test contributes 25% towards the final grade for the subject.	25%
4	Assessment 4 (Project 1)	This will be a group or individual student project which requires individual student or groups to produce a Research proposal on their selected research topic. The project is assessed by an assessment rubric and contributes 40% towards the final grade for the subject.	40%
Total:			100%

Subject Text:
Fellows, R., & Liu, A. (2015). Research Methods for Construction (4th ed.). John Wiley & Sons Ltd, West Sussex, UK

References:
Lucas, Ray, and Raymond Lucas. Research methods for architecture. Hachette UK, 2016.

Aksamija, Ajla. Research Methods for the Architectural Profession. Routledge, 2021.

AR117: BUILDING SCIENCE

Course(s)	Architecture (NQF Level 8)
Subject Name	Building Science
Subject Code	AR117
Duration	13 weeks
Contact Hours	7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points	19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode	Lectures
Prerequisites	Grade 12 'A' Entry
Co-requisites	None
Subject Coordinator	TBA

Synopsis

This subject introduces students to the crucial relationship between climate, man, and buildings. The subject allows students to realise that human beings are able to achieve their maximum productivity levels when they work in conducive atmospheric environments. Human beings assess their environments through their senses. Hence, students are introduced to important concepts such as climate, thermal comfort, thermal performance of buildings, lighting, and acoustics.

Subject Topics

1. Thermal Performance of Buildings
2. Lighting
3. Room Acoustics & Noise Control

Topic	Content
1. Thermal Performance of Buildings	1.1 Why does man build? 1.2 Relationship between climate, man, & buildings 1.3 Thermal comfort 1.4 Thermal quantities 1.5 Heat transfer (heat gain, heat loss)
2. Lighting	2.1 Photometric concepts 2.2 The human eye 2.3 Colors 2.4 Objectives of lighting 2.5 Natural daylighting 2.6 Artificial lamps
3. Room Acoustics & Noise Control	3.1 Room Acoustics 3.2 Acoustics for speech 3.3 Clarity & Power 3.4 Noise Control 3.5 Strategies to address external & internal noise

Subject Learning Outcomes (SLOs)

On completion of this subject, students will be able to:

1. Describe the major climatic types of the world
2. Describe the relationship between climate, man, and buildings and its effects on thermal comfort.
3. Explain basic thermal properties of building materials
4. Identify main heat sources affecting heat transfer in buildings.
5. Explain important concepts related to good lighting design
6. Discuss the main concerns in room acoustics & noise control

Assessment Tasks and Weightings
The assessment for this subject has two main parts: (i) continuous assessment worth 60%, and (ii) examination component worth 40%.
To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% (from 60% cont. assessment & 40% examination).

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(20 %)**
- **Test** **(20%)**
- **Assignment 2** **(20%)**
- **Examination** **(40%)**

Assessment 1 - **Assignment 1:** a) Identify the major climatic zones and (b) Describe the relationship between climate, man, and buildings

Assessment 2 - **Test:** Thermal comfort, Heat transfer, Heat Loss, & Heat Gain

Assessment 3 - **Assignment 2:** Lighting and acoustics

Assessment 4 - **Examination:** This is a written examination given in Week 14, which covers all topics covered from Week 1 to 13. It is worth 40% of the total marks.

Subject Text book

- Moore, F (1993) Environmental Control Systems: Heating Cooling Lighting, McGraw-Hill Inc, New York
- Julian, W (1983) Lighting: Basic Concepts. Dept of Architectural Science. University of Sydney

References

- Greenland, J. (1991) Foundations of Architectural Science. Faculty of Design Architecture and Building. University of Technology Sydney.
- Moore, J.E (1978) Design for Good Acoustics and Noise Control. The MacMillan Press Ltd, London
- Koenigsberger, O.H, Ingersoll, T.G, Mayhew, A, Szokolay, S.V (1973) Manual of Tropical Housing and Building. Longman Group Ltd, London

AR 120: ARCHITECTURAL DESIGN II

Course(s)	Bachelor of Architecture (NQF Level 8)
Subject Name	Architectural Design II
Subject Code	AR 120
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	**21** [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode	On campus
Prerequisites	AR 110
Co-requisites	None
Subject Coordinator	Design Studio Master

Synopsis

Developing and reinforcing student ability for self-expression through creative explorations of architectural form and space in two- and three-dimensional expressions of simple whole and parts of building typologies. This is achieved through creative exercises on designing with solids, voids, planes, frames, textures, and colours by using a variety of graphic, craft, sculptural and model-making media, and in combination with an introduction to architectural design and drawing of small to medium scale building types. Creating and visualising simple structural and construction technology experimentation on simple to medium scale public and domestic architectural building designs and with conscious awareness of traditional vernacular space relationships and their overlapping contradiction to modern design outcomes.
Participation in scheduled Architecture Seminars and Master-classes.

Subject Topics

1. Onsite Study
2. Vernacular architecture as design reference
3. Small & Medium Scale Building Design
4. Designing Residential Buildings.
5. Communal Architecture
6. Design Integration

Topic	Content
1. Onsite Study	1.1 Learning from existing architectural experience – Onsite investigation and study 1.2 Onsite Building Measurement and reproduction 1.3 Onsite study and recording as 'historical record'
2. Vernacular architecture as design reference	2.1 The design form and structural replication of Traditional Vernacular in domestic and traditional civic architecture. 2.2 The modern interpretation of Traditional Vernacular Architecture
3. Small & Medium Scale Building Design	3.1 The design of buildings that suit small and medium scale architectural forms and structures that are inspired by traditional and vernacular format.
4. Designing Residential Buildings	4.1 Domestic Residential Architecture
5. Communal Architecture	5.1 Small to Medium Scale Community Public Architecture
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Engage the creative impulse with confidence and vigour;
2. Use a variety of graphic and model making media;
3. Delineate simple designs, drawings and 3D representations and spatial expression of space creation and distribution.
4. Articulate basic design and understanding construction technology and application in simple to medium building structures.
5. Develop a conscious awareness and acceptability to user-space interactive relationships and space-use interpretation and transactions on socio-cultural correctness.
6. Attain competence and confidence in architectural creativity and partial project documentation.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1 (25%)**
- **Project 2 (25%)**
- **Final Project (40%)**
- **Semester Portfolio (10%)**

Assessment 1 - **Project 1: An Introductory task:** An individual based project taking cue from the final project undertaken in the previous semester addressing an elevated degree of architectural design requirements as set out in the project brief for on-site building measurement. The student is tasked to prepare, project, action-plan and a schedule of activities to achieve the final design outcome, in the vernacular building format for small to medium scale buildings.

Assessment 2 - **Project 2:** An Individual based design project in response to the project brief and design rubric in achieving design outcomes that expands architectural design creativity and promotes architectural design awareness of building and/or product outcome.

Assessment 3 - **Final Project:** A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for residential and medium scale public buildings.

Assessment 4 - **Semester Portfolio.** A compilation of all projects carried out in the semester in an A1 portfolio by each student.

Subject Text book

- Granet, K. (2011) The Business of Design: Balancing Creativity and Profitability, 1st Ed. Princeton Architecture Press.

References

- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.
- Booth, K.N.; and Hiss, E.; J. (2017) Residential Landscape Architecture: Design Process for the Private Residence; 7th Ed. Pearson.

AR121: DIGITAL ARCHITECTURE

Course(s)	Architecture (NQF Level 8)
Subject Name	Digital Architecture
Subject Code	AR121
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	**21** [(4.2 x 2) + (2.2 x 2) + (1.4 x 6)]
Delivery Mode	Lectures
Prerequisites	AR111
Co-requisites	None
Subject Coordinator	TBA

Synopsis

Developing advanced skills in the use of architectural design and drafting software with the assistance of computer aided design (CAD) tools. CAD is now a widely used tool that allows for the easier development of architectural design and design management integration. Students will be allowed to work with advanced CAD tools that will prepare them to grasp the principles of 2D drafting, 3D drafting and Building Information Modelling (BIM) tools with the use of selected CAD software.

Subject Topics

1. Introduction to Digital Architecture.
2. Application of 3D Modelling Concepts and 3D CAD Animation using BIM Principles.
3. Advance CAD Editing Concepts in 3D Digital Application
4. Concepts in BIM Technology and Application
5. Advance BIM Concepts in CAD Application
6. CAD Animation with BIM Application

Topic	Content
1. Introduction to Digital Architecture	1.1 Why Digital Architecture? 1.2 Advance CAD Software User Interface and Digital Architecture Terminologies.
2. Application of 3D Modelling Concepts and 3D CAD Animation using BIM Principles	2.1 Why CAD and BIM Tools? 2.2 3D Modelling Concepts in CAD with BIM Principles
3. Advance CAD Editing Concepts in 3D Digital Application	3.1 Understanding CAD and BIM Editing. 3.2 Exploring CAD and BIM Editing
4. Concepts in BIM Technology and Application	4.1 Understanding BIM Concepts in CAD Technology 4.2 Application of BIM Concepts in CAD Technology
5. Advance BIM Concepts in CAD Application	5.1 Understanding 3D Editing tools and Modify CAD Commands with BIM. 5.2 Exploring 3D Editing Concepts and their Application to CAD and BIM Projects.
6. CAD Animation with BIM Application	6.1 Understanding 3D Animation Editing and Modify CAD and BIM Commands. 6.2 Application of 3D CAD Animation Editing and their Application to BIM Projects.

Subject Learning Outcomes (SLOs)

On completing the subject, the student should be able to:

1. Undertake advance CAD terminologies;
2. Use advance CAD Commands;
3. Demonstrate competency in selected 3D CAD Software;
4. Work with architectural design and selected CAD drafting software;

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5. Produce 3D architectural presentation;
6. Modelling Animation using BIM technology.

Assessment Tasks and Weightings

The assessment for this subject is a continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (10%)**
- **Assignment 2 (10%)**
- **Test (20%)**
- **Project 1 (20%)**
- **Project 1 (40%)**

Assessment 1 - **Assignment 1:** 3D CAD Terminologies and general Concepts in 3D CAD Drafting.
Assessment 2 - **Assignment 2:** Advance Concepts in 3D CAD Drafting Exercises
Assessment 3 - **Test:** Advance Concepts and Terminologies in CAD
Assessment 4 - **Project 1:** 3D Application of CAD Concepts
Assessment 5 - **Project 2:** 3D Application of CAD with BIM Concepts

Subject Text book

- Aouad, G. (2012) Computer Aided Design Guide for Architecture, Engineering and Construction, 1st Edition, Routledge Publication, United Kingdom.

References

- Selected CAD Software Manuals
- Brightman, Michael (2018), The SketchUp Workflow for Architecture: Modelling Buildings, Visualizing Design, and Creating Construction Documents with SketchUp Pro and Layout, 2 edition Wiley Publication, New Jersey, USA.
- Richard Garber (2014), BIM Design: Realizing the Creative Potential of Building Information Modelling (AD Smart), 1st Edition, Wiley Publication, New Jersey, USA

AR 122: VERNACULAR ARCHITECTURE/BUILDING TRADITIONS

Course(s)	Architecture (NQF Level 8)
Subject Name	Vernacular Architecture/Building Traditions
Subject Code	AR 122
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	**21** [(4.2 x 2) + (2.2 x 2) + (1.4 x 6)]
Delivery Mode	Lectures
Prerequisites	AR111
Co-requisites	None
Subject Coordinator	TBA

Synopsis

Developing an awareness and appreciation of the global and regional socio-cultural, socio-economic, aesthetical and technical diversity and qualities of vernacular architectural practice and its place in the built environment, in education, professional development and practical application in modern architectural outcomes. Creating an awareness in appreciating and preserving Melanesian Vernacular Architecture and its Building Practices and Traditions in the context of its existing and prevalent social, cultural, climatic, material-built- culture and socio-economical traditions.

Subject Topics

1. The Theory of Vernacular Architecture
2. The Global View
3. The Variable of Influence
4. Socio-cultural influences
5. Melanesian Vernacular Architecture
6. My Domestic Vernacular Architecture and Building

Topic	Content
1. The Theory of Vernacular Architecture	1.1 The related theories of Vernacular Architecture and Building Tradition; 1.2 Selected global perspectives 1.3 The regional Australasian and Oceanian perspective 1.4 The local Melanesian perspective
2. The Global View	2.1 The reasons that promote various global vernacular practice 2.2 The physical, climatic, socio-cultural and economic variables that contribute and/or that dictates vernacular architecture/ building practices.
3. The Variable of Influence	3.1 The trend of Influence and dynamics that contribute to spatial change in traditional vernacular architecture/building practice.
4. Socio-cultural influences	4.1 The social, cultural, socio-economic variables that govern vernacular architectural and building practice at the global, regional and local fronts.
5. Melanesian Vernacular Architecture	5.1 The Melanesian Vernacular Architecture and Traditional Built Culture and Practice 5.2 The diversity of Melanesian Built Culture 5.3 The influences and the shifting dynamics of modern vernacular change and adaptability
6. My Domestic Vernacular Architecture and Building	6.1 Student project in documenting their traditional Village layouts, distribution layout for family and extended family in the village, and the family home layout – the apportioned allotment in the family compound. 6.2 The construction of a 1:20 model of the traditional family house/home setting.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Describe the socio-cultural, socio-economic, climatic, environmental and other influential variables, which shape vernacular architecture and building practices.
2. Appreciate the importance of conserving/preserving vernacular building traditions.
3. Appreciate the traditional forms and methods of building process and construction.
4. Articulate the potential for adaptation of re-interpretation of vernacular traditions in the contemporary design of forms, structures and ornamentation of buildings.
5. Understand the symbolic, social and cultural relationship and user-setting transactional relationships of place and place-making.
6. Have knowledge and ability to transfer traditional typologies to modern architectural and settlement development formats in mitigating climate change.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 70% overall, and at least 30% for the Final Project must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (10%)**
- **Test (20%)**
- **Project 1 (30%)**
- **Project 2 (40%)**

Assessment 1 - **Assignment:** The Theory and Concept of Vernacular Architecture: A individual task assigned to research into the theory and concept of vernacular architecture and its place in the built environment, in education, professional development and practice.

Assessment 2 - **Test:** This is designed to capture the knowledge base that addresses the socio-cultural, socio-economic, climatic, environmental and other influential variables, which shape vernacular architecture and building practices. The appreciation of the importance of conserving/preserving vernacular building traditions and utilizing and understanding traditional forms and methods of building process and construction.

Assessment 3 - **Project 1:** This is an individual base research project in documenting a traditional village setting by drawings of the village layout, the family and clan visual demarcations and community spaces. This will also include the documentation of traditional building types and their space-use allocations.

Assessment 4 - **Project 2:** This is an individual base project where the student is required to build a 1:20 scale model of a traditional domestic house in their respective villages.

Subject Textbook

- Jarzombek, M. M. (2013) Architecture of First Societies: A Global Perspective, 1st Ed. Wiley.
- Oliver, P. (2007) Dwellings: Vernacular House Worldwide; Phaidon Press

References

- Oliver; P. (1979) The Encyclopaedia of Vernacular Architecture of the World. Cambridge University Press.

AR 122: CONSTRUCTION ECONOMICS I

Course(s)	Architecture (NQF Level 8)
Subject Name	Construction Economics I
Subject Code	CM 124
Duration	13 Teaching weeks
Contact Hours	7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points	**19** [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode	Lectures
Prerequisites	
Co-requisites	None
Subject Coordinator	TBA

Synopsis

The nature of economics and the economic environment in which the building industry operates. To introduce basic concepts about various types of business organisations and their establishment and management.

Subject Topics

1. Economic Environment
2. International Trade
3. Business Forms and Basic Accounting

Topic	Content
1. Economic Environment	1.1 Introduction to general economics, opportunity cost, supply and demand, marginal analysis, market intervention 1.2 Price floors and price ceilings and their effects 1.3 Examples of the foregoing concepts as applied to the building industry 1.4 The national income account, gross national product 1.5 Unemployment and inflation: statistical price indices Money and the banking system, the central bank and commercial banks, monetary policy and the national economy 1.6 Budget deficits, interest rates and inflation, monetary and fiscal measures: government control methods; 1.7 Productivity and growth in national wealth
2. International Trade	2.1 International economics, international trade, exchange rates, balance of payments; 2.2 Payment for imports, letters of credit, telegraphic transfers, bills of exchange; 2.3 Forward cover, import duties, taxes of the foregoing concepts as applied to the building industry; 2.4 Imported equipment, duties, exchange rates, risks, contracts with foreign firms.
3. Business Forms and Basic Accounting	3.1 Forms of business organization, establishing and running a business, directors' responsibilities 3.2 Financial structure of practices and related businesses, financial management: assets and liabilities, working and fixed capital, sources of capital, useful financial ratios, profit, taxation, depreciation, dividends, general reserve 3.3 Market planning; 3.4 Introduction to basic accounting and financial statements: profit and loss statements, analysis and interpretation of balance sheets, annual business returns, general office and project overheads, trading mark-ups, charge-out rates, basic office systems 3.5 Financial planning and control in projects, causes and prevention of financial instability and business failure

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Construct a basic economic model;
2. Explain the concept of planning for the efficient allocation of resources;
3. Describe how economic modelling can predict the present and future pattern of economic growth, inflation and unemployment;
4. Expound on the principles and procedures of international trade.
5. Select forms of businesses to suit various circumstances;
6. Prepare basic financial statements for small and medium-size practice and other related businesses;
7. Comment on the solvency and profitability of practices and related businesses.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 70% overall, and at least 30% for the final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(25%)**
- **Test** **(25%)**
- **Seminar** **(20%)**
- **Project 2** **(30%)**

Assessment 1 - **Assignment:** Carry out literature review on the basic structure of an economic model and how the construction industry is affected. The assignment is assessed by an assessment rubric and contributes 25% towards the final grade for the subject

Assessment 2 - **Test:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the principles of economics and how building price is determined. The test is assessed by the number of questions and their weighted marks and contributes 25% towards the final grade for the subject.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The current economic climate and the demand for building products are investigated. The seminar is assessed by an assessment rubric and contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks and contributes 30% towards the final grade for the subject.

Subject Textbook

- Calvert, R. E., (2012) Introduction to building management, Taylor & Francis, Hoboken, USA.
- Harris, F., McCaffer, M. (2013) Modern construction management, Wiley-Blackwell, Hoboken.
- Harcourt, S. V., (1988) Commerce and development in Papua New Guinea, Longman Cheshire, Melbourne.

References

- Tashjian, P., (1989) Business organisations in Papua New Guinea, Law Book Company, North Ride, Australia.
- Upson, A., (1987) Financial management for contractors, Blackwell Scientific Publications Professional Books, London, UK.
- Cairncross**,** Alexander K. Sinclair, Peter, (1982) Introduction to economics, Butterworth, Boston, USA.

AR 210: ARCHITECTURAL DESIGN II

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Architectural Design II
Subject Code: AR 210
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites: AR 120
Co-requisites:
Subject Coordinator: Design Studio Master

Synopsis

Developing and reinforcing student ability for self-expression through creative explorations of architectural form and space in two, and three-dimensional expressions of simple whole and parts of building typologies. This is achieved through creative exercises on designing with solids, voids, planes, frames, textures, and colours by using a variety of graphic, craft, sculptural and model-making media, and in combination with an introduction to architectural design and drawing of small to medium scale building types. Creating and visualising simple structural and construction technology experimentation on simple to medium scale public and domestic architectural building designs and with conscious awareness of traditional vernacular space relationships and their overlapping contradiction to modern design outcomes.
Participation in scheduled Architecture Seminars and Master-classes.

Subject Topics

1. Onsite Study
2. Vernacular architecture as design reference
3. Small & Medium Scale Building Design
4. Designing Residential Buildings
5. Communal Architecture
6. Design Integration

Topic	Content
1. Onsite Study	1.1 Learning from existing architectural experience – Onsite investigation and study 1.2 Onsite Building Measurement and reproduction 1.3 Onsite study and recording as 'historical record'
2. Vernacular architecture as design reference	2.1 The design form and structural replication of Traditional Vernacular in domestic and traditional civic architecture. 2.2 The modern interpretation of Traditional Vernacular Architecture
3. Small & Medium Scale Building Design	3.1 The design of buildings that suit small and medium scale architectural forms and structures that are inspired by traditional and vernacular format.
4. Designing Residential Buildings	4.1 Domestic Residential Architecture
5. Communal Architecture	5.1 Small to Medium Scale Community Public Architecture
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.
7. Onsite Study	7.1 Learning from existing architectural experience – Onsite investigation and study 7.2 Onsite Building Measurement and reproduction 7.3 Onsite study and recording as 'historical record'

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Engage the creative impulse with confidence and vigour;
2. Use a variety of graphic and model making media;
3. Delineate simple designs, drawings and 3D representations and spatial expression of space creation and distribution.
4. Articulate basic design and understanding construction technology and application in simple to medium building structures.
5. Develop a conscious awareness and acceptability to user-space interactive relationships and space-use interpretation and transactions on socio-cultural correctness.
6. Attain competence and confidence in architectural creativity and partial project documentation.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1** **(25 %)**
- **Project 2** **(25%)**
- **Final Project:** **(40%)**
- **Semester Portfolio** **(10%)**

Assessment 1 - **Project 1: An Introductory task:** An Individual based project taking cue from the final project undertaken in the previous semester addressing an elevated degree of architectural design requirements as set out in the project brief for on-site building measurement. The student is tasked to prepare, and project-action plan and a schedule of activities to achieve the final design outcome, in the vernacular building format for small to medium scale buildings.

Assessment 2 - **Project 2:** An Individual based design project in response to the project brief and design rubric in achieving design outcomes that expands architectural design creativity and promotes architectural design awareness of building and/or product outcome.

Assessment 3 - **Final Project:** A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for residential and medium scale public buildings.

Assessment 4 - **Semester Portfolio**. A compilation of all projects carried out in the semester in an A1 portfolio by each student.

Subject Textbook

Granet, K. (2011) The Business of Design: Balancing Creativity and Profitability, 1st Ed. Princeton Architecture Press.

References

- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.

Readings

- Booth, K.N.; and Hiss, E.; J. (2017) Residential Landscape Architecture: Design Process for the Private Residence; 7th Ed. Pearson.

AR 212: HISTORY OF ARCHITECTURE

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: History of Architecture
Subject Code: AR 212
Duration: 13 teaching weeks
Contact Hours: 7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points: 19 [(4.2 x 3) + (2.2 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: Design Studio Master

Synopsis

Introduction of selected Western traditions such as Neoclassical, Baroque, Gothic, Renaissance, Romanesque, Modern, and Post-Modern Architecture whereby architecture is seen to arise when urbanity developed and people started to live in cities, and that cities and urbanity have taken root in these societies, and the view that cities are the context for most current architectural developments. Developing an awareness through a cross-cultural study from the ancient to the modern time, where settlements and cities were and are seen as the generators (in the contexts for architecture) of an integrated relationship, in culture, art, technology and man-environment. The appreciation of architecture as the shaper of city form and its evolving 'genius loci', and architects-designers as the shapers of that built fabric. Also taking into the contextual factors such as materials, technology, customs, beliefs, resources, power, knowledge, and the recent challenge of the 'climate change' agenda that shaped and is shaping cities. An examination of the imposition of empires and colonies, of architectural productions and their influences, of issues of nationalism, identity, and hybridity is undertaken. Also, a perspective on global and local practices that creates a hybrid of contemporary regionalized practice.

Subject Topics

1. Onsite Study
2. Vernacular architecture as design reference
3. Small & Medium Scale Building Design
4. Designing Residential Buildings
5. Communal Architecture
6. Design Integration

Topic	Content
1. Onsite Study	1.1 Learning from existing architectural experience – Onsite investigation and study 1.2 Onsite Building Measurement and reproduction 1.3 Onsite study and recording as 'historical record'
2. Vernacular architecture as design reference	2.1 The design form and structural replication of Traditional Vernacular in domestic and traditional civic architecture. 2.2 The modern interpretation of Traditional Vernacular Architecture
3. Small & Medium Scale Building Design	3.1 The design of buildings that suit small and medium scale architectural forms and structures that are inspired by traditional and vernacular format.
4. Designing Residential Buildings	4.1 Domestic Residential Architecture
5. Communal Architecture	5.1 Small to Medium Scale Community Public Architecture
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.
7. Onsite Study	7.1 Learning from existing architectural experience – Onsite investigation and study 7.2 Onsite Building Measurement and reproduction 7.3 Onsite study and recording as 'historical record'

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Engage the creative impulse with confidence and vigour;
2. Use a variety of graphic and model making media;
3. Delineate simple designs, drawings and 3D representations and spatial expression of space creation and distribution.
4. Articulate basic design and understanding construction technology and application in simple to medium building structures.
5. Develop a conscious awareness and acceptability to user-space interactive relationships and space-use interpretation and transactions on socio-cultural correctness.
6. Attain competence and confidence in architectural creativity and partial project documentation.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1** **(25%)**
- **Project 2** **(25%)**
- **Final Project:** **(40%)**
- **Semester Portfolio** **(30%)**

Assessment 1 - **Project 1: An Introductory task:** An Individual based project taking cue from the final project undertaken in the previous semester addressing an elevated degree of architectural design requirements as set out in the project brief for on-site building measurement. The student is tasked to prepare, and, project-action plan and a schedule of activities to achieve the final design outcome, in the vernacular building format for small to medium scale buildings.

Assessment 2 - **Project 2:** An Individual based design project in response to the project brief and design rubric in achieving design outcomes that expands architectural design creativity and promotes architectural design awareness of building and/or product outcome.

Assessment 3 - **Final Project:** A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for residential and medium scale public buildings.

Assessment 4 - **Semester Portfolio**. A compilation of all projects carried out in the semester in an A1 portfolio by each student.

Subject Textbook
- Granet, K. (2011) The Business of Design: Balancing Creativity and Profitability, 1st Ed. Princeton Architecture Press.
- Booth, K.N.; and Hiss, E.; J. (2017) Residential Landscape Architecture: Design Process for the Private Residence; 7th Ed. Pearson.

References
- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.

Readings
- Insert the readings that will be provided to students to read or web links to the source of the reading.

AR 214: STRUCTURES

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Structures
Subject Code: AR 214
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

To introduce the theory and design features of building structures and the basic structural mechanics in building systems. The adaptation of a quantitative approach to structural mechanics and the discussion of the behavioural outcome that fosters and the understanding of the part that structures play as an active influence in architectural design. The understanding of forces and displacements and moments and shears is quantitative terms. The use of structural elements of timber, steel and reinforced concrete. To grasp the understanding of building structural performance under the stress and pressures of external and internal compressive, tensile, loads, stresses and lateral forces. The choice of structural systems likely to be most suitable, checking structural stability under both vertical and horizontal loads by means of 'load-paths', estimation of loads acting on selected structural members, estimation of maximum bending moments and shear force in beams and estimation of structural member sizes.

Subject Topics

1. Forces, Moments and Equilibrium
2. Ties and Struts
3. Loading on Buildings and Graphical Statics
4. Pin-jointed Structures
5. Bracing Buildings

Topic	Content
1 Forces, Moments and Equilibrium	1.1 Forces on Structure 1.2 Measure of Forces 1.3 External Forces 1.4 Resultants and Components 1.5 Moments 1.6 Couples 1.7 Equilibrium 1.8 Co-planner Forces 1.9 Concurrent Force Systems 1.10 Forces and supports 1.11 Stability and Determinacy 1.12 Parallel Force Systems 1.13 Internal Forces and Deformation
2 Ties and Struts	2.1 Pressure 2.2 Stress 2.3 Types of Stress 2.4 Strain and Elasticity 2.5 Permissible Stress 2.6 Ties and Struts

3 Loading on Buildings and Graphical Statics	3.1 Loading Codes 3.2 Dead Loads 3.3 Live Loads 3.4 Wind Loads 3.5 Computation of Loads acting on building structure 3.6 Graphical Statics
4 Pin-jointed Structures	4.1 Pin-jointed Frames 4.2 The Maxwell Diagram 4.3 Method of Joints 4.4 Method of Sections 4.5 Pitch Trusses
5 Bracing Buildings	5.1 Triangulation 5.2 Rigid Frames 5.3 Three-Dimensional Structure
6 Loading on Buildings and Graphical Statics	6.1 Loading Codes 6.2 Dead Loads 6.3 Live Loads 6.4 Wind Loads 6.5 Computation of Loads acting on building structure 6.6 Graphical Statics
7 Pin-jointed Structures	7.1 Pin-jointed Frames 7.2 The Maxwell Diagram 7.3 Method of Joints 7.4 Method of Sections 7.5 Pitch Trusses

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Expound on basic structural theory as related to the design of building structures, and structural members;
2. Expound on basic structural theory as related to the design of structural timber, structural steel elements and reinforced concrete.
3. Understand elements of lateral stability for structural frames and determine design loads for buildings.
4. Understand the constituents and properties of structural timber, structural steel and reinforced concrete.
5. Determine the axial forces in plane pin-connected trusses and frames; the internal forces in statically determinate beams and properties of areas.
6. Use relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes;
7. Understand Calculate bending and shear stresses and deflection of structural elements
8. The design of beams – Timber Beams

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, and 40% for the Final Project must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(20 %)**
- **Assignment 2** **(20%)**
- **Test 1:** **(20%)**
- **Final Assessment Project:** **(40%)**

Assessment 1 - **Assignment 1:** Group-based research on all the building structure types, the structural theories applicable to the building types, the structural materials applied. The assessment contributes 20% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** An individual task to show evidence of building structure understanding of lateral stability for structural frames and design loading for buildings, the constituents and

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properties of structural timber, structural steel and reinforced concrete in an architecture design project. The Progress Report contributes 20% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building structural systems in determining the axial forces in plane pin-connected trusses and frames; the internal forces in statically determinate beams and properties of areas; and the use relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes;
This assessment contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Assessment Project:** An individual task to calculate bending and shear stresses and deflection of structural elements and, the use of relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes. The presentation contributes 40% towards the final grade for the subject.

Subject Textbook

- K.J. Wyatt, (1979) Principles of Structure, UNSW School of Architecture, Sydney.
  Departmental Modules

References

- Hough, Richard (1982) Structures Design Package 2nd Edition, School of Architecture, UNSW, Sydney Australia.
- Whitfield David (1983) Papua New Guinea Structural manual for Domestic Buildings, PNG Department of Works, Port Moresby.

AR 213: BUILDING SYSTEMS I

Course: Bachelor of Architecture (NQF Level 8)
Subject Name : Building Systems I
Subject Code: AR 213
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

This subject provides students with the knowledge base of common building materials and properties and use in construction; for low-rise small to medium scale residential buildings and small to medium scale commercial and institutional buildings. The substructure elements of: excavation, foundations, and ground floor construction. The superstructure elements of: external walls, internal partitions, joinery items including doors, windows, wardrobes, cupboards, main frames in steel, concrete and timber, cladding systems, fire requirements, glazed areas, common stairways. Roofs: types of roof construction, covering material, water collection and storm water drainage. Finishing trades: various trade works, specialist contractors, security applications, proprietary partitioning. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing. integration of services into the building fabric, special requirements for industrial waste. External works: hard landscaping, delivery and storage requirements, parking, lighting and security systems.

Subject Topics

1. Building Substructure
2. Building Superstructure
3. External and internal cladding
4. Roofing Structures and Systems
5. Building Material and Compositions
6. Building Services and Service Installations

Topic	Content
1. Building Substructure	1.1 Common building materials: 1.2 properties and use in construction. 1.3 Substructure: excavation, foundations, 1.4 ground floor construction.
2. Building Superstructure	2.1 Superstructure: Vertical and Horizontal superstructure 2.2 External and Internal Load-bearing walls, 2.3 internal partitions, 2.4 joinery items including doors, windows, wardrobes, cupboards, staircases.
3. External and internal cladding	3.1 External Cladding 3.2 Weather Proofing
4. Roofing Structures and Systems	4.1 Roofs: types of roof construction, covering material, storm water drainage.
5. Building Material and Compositions	5.1 Timber 5.2 Steel 5.3 Concrete 5.4 Glass
6. Building Services and Service Installations	6.1 Finishing trades: plastering, fair faced blockwork, proprietary boards, painting and tiling. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Possess the knowledge of building material types, their properties and their application in building works.
2. Describe the various domestic-scale construction systems;
3. Prepare construction drawings showing how the materials are placed and fixed into position;
4. Explain the function of written technical specifications and write sample clauses;
5. Define the terminology relating to various building services;
6. Identify the type, range and functions of the various external and internal building elements;
7. Make appropriate choices and recommendations for the various supply and distribution systems based on economics and efficiency

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 50% overall, and at least 40% for the Final Written Examination must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(10 %)**
- **Assignment 2** **(10%)**
- **Test 1:** **(20%)**
- **Final Assessment Project:** **(20%)**
- **Final Examination:** **(40%)**

Assessment 1 - **Assignment 1:** Group-based research on all the building, substructure, superstructure, material types, their properties, application and where the material and, prevalent in their usage and, in the types of buildings. The assessment contributes 10% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** An individual task to show evidence of project documentation (construction drawings and technical specification required) of an architecture design project. The Progress Report contributes 10% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building systems comprehension of material science, service installations, and buildability application. This assessment contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Assessment Project:** An individual task to identify the types, range and functions of external and internal building elements and making appropriate choices and recommendations for the supply for various service distribution systems installation on economic value and efficiencies. The presentation contributes 20% towards the final grade for the subject.

Assessment 5 - **Final Examination**

Subject Textbook
Chudley R.; and Greeno, R. (2005) Building Construction Handbook, 5th Ed. Elsevier Butterworth Heinemann, Singapore.

References

- Reid E., Understanding Buildings, Longman Scientific and Technical, UK.
- Burbery P., Environment & Services, Mitchell's Building Series, Longman, Essex.
- PNG Department of Works: Architectural Technical Specification., reprint. Chapter 301: Building Act, PNG Government Printer.

AR 220: ARCHITECTURAL DESIGN INTEGRATION IV

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Architectural Design Integration IV
Subject Code: AR 220
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites: AR 210
Co-requisites:
Subject Coordinator: Design Studio Master

Synopsis

Developing skills in designing medium-complex to large scale institutional and commercial building types by applying current technological design innovations, structural fitness, socio-cultural and environmental principles involved in the architectural design processes and considerations, as well as incorporating traditional values and principles of the Melanesian society.

A selected number of architecture design projects for medium-complex to large scale buildings at least 2-3 levels based on outline programs and involving the simultaneous resolution of plan, form, material and structure, using and/or interpreting traditional architectural practices and forms for inspiration. A design rubric is used in carrying out all assessments. Participation in scheduled Architecture Seminars and Master-classes.

Subject Topics

1. Designing with Sustainable solutions in the Rural and Urbanizing context.
2. Commercial Architecture
3. Medium to Complex Multiple Use Buildings
4. Designing Residential/Institutional Mix-Use Buildings
5. Communal Architecture
6. Design Integration

Topic	Content
1. Designing with Sustainable solutions in the Rural and Urbanizing context.	1.1 Designing in meeting sustainable requirements in contextual localities.
2. Commercial Architecture	2.1 The design form and structure that has a medium to complex user-application and requirement. 2.2 Designing to meet sustainability requirements and outcomes.
3. Medium to Complex Multiple Use Buildings	3.1 The design of buildings that suit medium-complex scale architectural forms and structures that are inspired by traditional and vernacular format.
4. Designing Residential/Institutional Mix-Use Buildings	4.1 Multiple level Residential/Institutional Architecture with multiple user needs
5. Communal Architecture	5.1 Large Scale Civic/Community Public Architecture
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Informatively conduct, analyses and synthesises sustainable medium-complex to large scale building design processes;
2. Resolve the spatial layout of architectural and building spaces, form and structure of medium to large scale buildings to context;
3. Reflect traditional architectural concepts and built-culture forms in contemporary use and application.
4. Document and prepare specification requirements of at least one project in demonstrating technical comprehension and competitiveness.
5. Demonstrate capability to articulate the economics of a designed-building.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1: (25 %)**
- **Project 2: (25%)**
- **Final Project: (40%)**
- **Semester Portfolio: (10%)**

Assessment 1 - **Project 1:** Design a Medium Complex single level Commercial Building: A Individual based project building up continuity from the final project undertaken in the previous semester addressing an elevated degree of building design requirements as set out in the project brief. The student is tasked to prepare and, project-action plan and a schedule of activities to achieve the final design outcome, in a modern building format for medium complex commercial buildings.

Assessment 2 - **Project 2:** Design of a complex multiple level (3 maximum) Civic Building. An Individual based design project in response to the project brief and design rubric in achieving design outcomes that expands architectural design creativity and promotes architectural design awareness of building and/or product outcome.

Assessment 3 - **Final Project:** Design of an Urban multiple level Mix-Use (civic-commercial) Building. A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for medium to complex scale public buildings.

Assessment 4 - **Semester Portfolio.** A compilation of all projects carried out in the semester in an A1 portfolio by each student**.**

Subject Textbook

- Chudley R.; and Greeno, R. (2005) Building Construction Handbook, 5th Ed. Elsevier Butterworth Heinemann, Singapore.

References

- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.
- PNG Department of Works: Architectural Technical Specification., reprint. Chapter 301: Building Act, PNG Government Printer.

AR 222: MODERN ARCHITECTURE

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Modern Architecture
Subject Code: AR 222
Duration: 13 teaching weeks
Contact Hours: 7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points: 19 [(4.2 x 3) + (2.2 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites: AR 212 History of Architecture
Co-requisites:
Subject Coordinator: TB

Synopsis

The goal of this course is to investigate with student's backgrounds on some of the pivotal events that have shaped our understanding and approach to modern architecture. Emphasis of discussion will be primarily on buildings and works of individual architects. Canonical architects, buildings and movements that have exerted significant influences on the development of contemporary architecture will be studied in detail. An examination of: some specific manifestations of modern architecture in the region; the origins and influences that shape(d) this architecture; the debates that surround such modern, colonial and postcolonial, and regional, design practice. The course will also enable a larger visual vocabulary to enable students to communicate more effectively about design, it will also aid in developing their own design ideas in Studio. Gaining an insight into the canonical architectural works and movements in the past beyond just the forms will give the students an opportunity to place their own design ideas within the architectural tradition. As a final project, each student will analyse a building through drawings, text, bibliography and a physical model in a format ready for documentation and exhibition.

Subject Topics

1. Introduction
2. Canonical Architects I
3. Canonical Architects II
4. Canonical Architects III
5. Postmodernism
6. Suburbia, sprawl

Topic	Content
1. Introduction	1.1 The rise of modern architecture 1.2 The pivotal events that have shaped our understanding and approach to modern architecture.
2. Canonical Architects I	2.1 Selected canonical architects 2.2 Louis Sullivan: Adler and Sullivan 2.3 Frank Lloyd Wright 2.4 Walter Gropius: Bauhaus and Harvard
3. Canonical Architects II	3.1 Le Corbusier Buildings and Cities 3.2 Mies van der Rohe: Berlin and America, less is more 3.3 Philip Johnson and the International Style of 1932 3.4 Alvar Aalto
4. Canonical Architects III	4.1 Urbanism CIAM and Team X 4.2 Aldo Van Eyck 4.3 James Stirling 4.4 Aldo Rossi and Carlo Scarpa 4.5 Five Architects: Eisenman, Graves, Gwathmey, Hejduk, Meier
5. Postmodernism	5.1 Deconstructivist architecture 5.2 Rem Koolhaas and Frank Gehry 5.3 Documentary: Sketches of Frank Gehry
6. Suburbia, Sprawl	6.1 Congress for New Urbanism, Duany Plater-Zyberk 6.2 William McDonough, green building practices

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Understand the theoretical, technological, social, economic and environmental factors involved in the development of modern architecture.
2. Identify and discuss the major canonical movements, works and figures in modern architecture.
3. Explain the principles employed and the influences on the making of the architecture of a number of key designers of modern architecture.
4. Analyse, discuss and communicate architectural issues pertinent to the design and practice of contemporary architecture in the region including aesthetic and cultural aspects.
5. Develop an awareness of current issues that shape the various forms of contemporary architecture and the discourses that surround it.
6. The impact and changing scope in addressing architectural advances and zero carbon emissions requirements.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 60% overall, and 40% for the Final Examination must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (10 %)**
- **Assignment 2: (10%)**
- **Test 1: (10%)**
- **Final Assessment Project: (30%)**
- **Final Examination: (40%)**

Assessment 1 - **Assignment 1:** Group-based research on, Modern Architecture Movement, noting the premises that influenced the movement. Identifying and discussing the major canonical movements, works and figures in modern architecture in different timelines.

Assessment 2 - **Assignment 2:** An individual task in explaining the principles employed and the influences on the making of the architecture of a number of key designers of modern architecture. Analyse, discuss and communicate architectural issues pertinent to the design and practice of contemporary architecture in the region including aesthetic and cultural aspects by these designer-architects.

Assessment 3 - **Test 1:** The current issues that shape the various forms of contemporary architecture.

Assessment 4 - **Final Assessment Project:** As a final project, each student will analyse a building through drawings, text, bibliography and a physical model in a format ready for documentation and exhibition.

Assessment 5 **Final Examination**

Subject Textbook

- Ching, F. D. K.; Jarzombek, M. M. and Prakash, V. (2017) A Global History of Architecture, 3rd Ed. Wiley.

References

- Ingersoll, R. (2018) World Architecture: A Cross-Cultural History, 2nd Ed. Oxford University Press.
- Curtis W. ‘Modern Architecture since 1900’ 1996.
- Frampton, K (2007) Modern Architecture: a critical history
- The Thames and Hudson Dictionary of 20th-Century Architecture, Tzonis and Lefaivre: Tropical Architecture. Taschen series (Art, Architecture, Design) especially Kahn ed:
- Venturi R. ‘Complexity and Contradiction in Architecture’ 1966.

AR 223: BUILDING SYSTEMS II

Course: Bachelor of Architecture (NQF Level 8)
Subject Name : Building Systems II
Subject Code: AR 223
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites: AR 213 Building Systems I
Co-requisites:
Subject Coordinator: TBA

Synopsis

This subject provides the knowledge base of common and new building materials, technologies, properties and use in construction; for medium to high-rise commercial, institutional and civic buildings. The substructure elements of: excavation, foundations, and ground floor construction. The superstructure elements of: external walls, internal partitions, joinery items including doors, windows, wardrobes, cupboards, main frames in steel, concrete and timber, cladding systems, fire requirements, glazed areas, common stairways. Roofs: types of roof construction, covering material, water collection and storm water drainage. Finishing trades: various trade works, specialist contractors, security applications, proprietary partitioning. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing. integration of services into the building fabric, special requirements for industrial waste. External works: hard landscaping, delivery and storage requirements, parking, lighting and security systems.

Subject Topics

1. High-rise Building Substructure
2. High-rise Building Superstructure
3. Modern external and internal cladding technology
4. Roofing Structures and Systems
5. Building Material Technology and Compositions
6. Building Services and Service Installations

Topic	Content
1. High-rise Building Substructure	1.1 Materials and technology applications on common and modern building construction requirements: 1.2 Substructure: excavation, foundations, 1.3 Ground and successive floor construction considerations.
2. High-rise Building Superstructure	2.1 Superstructure: Vertical and Horizontal superstructure 2.2 External and Internal Load-bearing walls, internal partitions, 2.3 Joinery items including doors, windows, wardrobes, cupboards, staircases.
3. Modern external and internal cladding technology	3.1 External Cladding 3.2 Weather Proofing
4. Roofing Structures and Systems	4.1 Roofs: types of roof construction, covering material, storm water drainage.
5. Building Material Technology and Compositions	5.1 Timber 5.2 Steel 5.3 Concrete 5.4 Glass
6. Building Services and Service Installations	6.1 Finishing trades: plastering, fair faced blockwork, proprietary boards, painting and tiling. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Possess the knowledge of building material types, their properties and their application in selected building works.
2. Describe the various medium to high-rise commercial, institutional and civic-scale construction systems;
3. Prepare construction drawings showing how the materials are placed and fixed into position;
4. Explain the function of written technical specifications and write sample clauses;
5. Define the terminology relating to various building services in selected building types;
6. Identify the type, range and functions of the various external and internal building elements in the selected building types;
7. Make appropriate choices and recommendations for the various supply and distribution systems based on economics and efficiency.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Written Examination must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (10 %)**
- **Assignment 2: (10%)**
- **Test 1: (20%)**
- **Final Assessment Project: (20%)**
- **Final Examination: (40%)**

Assessment 1 - **Assignment 1:** Group-based research on high-rise building, substructure, superstructure, material types, their properties, application and where the material and, prevalent in their usage and, in the types of buildings. The assessment contributes 10% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** An individual task to show evidence of project documentation (construction drawings and technical specification required) of a high-rise architecture design project. The Progress Report contributes 10% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building systems comprehension of material science, service installations, and buildability application. This assessment contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Assessment Project:** An individual task to identify the types, range and functions of external and internal building elements and making appropriate choices and recommendations for the supply for various service distribution systems installation on economic value and efficiencies. The presentation contributes 20% towards the final grade for the subject.

Assessment 5 **Final Examination**

Subject Textbook
Watson, D.; (2004) Time Saver Standards for Architectural Design: Technical Data for Professional Practice, 8th Ed. Mc Graw-Hill Education

References

- Reid E., Understanding Buildings, Longman Scientific and Technical, UK.
- Burbery P., Environment & Services, Mitchell's Building Series, Longman, Essex.
- Chudley R.; and Greeno, R. (2005) Building Construction Handbook, 5th Ed. Elsevier Butterworth Heinemann, Singapore.
- PNG Department of Works: Architectural Technical Specification., reprint. Chapter 301: Building Act, PNG Government Printer.

AR 272: ARCHITECTURAL THEORY

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Architectural Theory
Subject Code: AR 272
Duration: 13 teaching weeks
Contact Hours: 7 [3hrs lectures + 2hrs tutorial + 2hrs projects]
Credit Points: 19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis
This subject introduces students to the understanding of theory as it affects the design and meaning of architectural production. It is an attempt to help students to come to terms with key areas of theory which have been identified as important in architectural design and designing as a cultural activity.

Subject Topics

1. Architectural History & Architectural Theory
2. Sustainable Architecture, green architecture
3. Regional architecture: Melanesian architecture, Tropical architecture

Topic	Content
1. Architectural History & Architectural Theory	1.1 Difference between history & theory 1.2 Thinking is an essential discipline in architecture 1.3 Where do architects get their ideas from? 1.4 Building styles
2. Sustainable Architecture, green architecture	2.1 Climate-change a global concern 1.1 A focus on sustainable architecture
2.0 Regional architecture: Melanesian architecture, Tropical architecture	2.1 Architecture is representation of social institutions in built form. 2.2 Relationship between architecture and other institutions in society

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Display an understanding of how theories of architecture can affect their own self-awareness in design,
2. Be able to critically analyse designs,
3. Be able to engage meaningfully in informed discussion and writing.
4. Explain the global concerns on climate-change and its relationship with sustainable architecture.
5. Describe where architects get their design ideas from.
6. Explain why identity and regional architecture is important.

Assessment Tasks and Weightings

- The assessment for this subject is 100% continuous assessment.
- To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Test 1: (40%)**
- **Flipped Class: (20%)**

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Assessment 1 -	**Assignment 1:** What is architectural theory and why it is important for architects
Assessment 2 -	**Assignment 2:** Reason as to why certain architectural movements come about?
Assessment 3 -	**Test 1:** Test on material covered from wk1 to wk11.
Assessment 4 -	**Final Assessment Project:** Presentation of Famous Architectural Theorists

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

References

- Forty, Adrian. Words and Buildings: A Vocabulary of Modern Architecture. London: Thames and Hudson, 2000.
- Horowitz, Maryanne Cline, ed. The New Dictionary of the History of Ideas. Detroit: Charles Scribner's Sons; Gale, 2005.
- Kruft, Hanno-Walter. A History of Architectural Theory: From Vitruvius to the Present. London: Swimmer; New York: Princeton Architectural Press, 1994.
- Evers, Bernd, and Christof Thoenes. Architectural Theory: From the Renaissance to the Present: 89 Essays on 117 Treatises. Köln Germany, Los Angeles: Taschen, 2003.

AR 310: ARCHITECTURAL DESIGN INTEGRATION IV

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Architectural Design Integration IV
Subject Code: AR 310
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) +(1.4 x 6)]
Delivery Mode: On campus
Prerequisites: **AR220 Integrated Design IV**
Co-requisites:
Subject Coordinator: **Design Studio Master**

Synopsis
Carry out a number of design projects (at least three) based on complex low-rise, single and multi-purpose buildings in both urban and rural settings, emphasising the need for social, environmental, cultural, economic and climate responsive, sustainable and including an introduction to the basic principles and practice of site planning, landscaping, urban design and urban-scape. Develop and design buildings that are structurally sound, buildable, sustainable with green architectural design consideration, and using 2D and 3D digital applications. A design rubric is used in carrying out all assessments. Participation in scheduled Architecture Seminars and Master-classes.

Subject Topics
1. Architectural History & Architectural Theory
2. Sustainable Architecture, green architecture
3. Regional architecture: Melanesian architecture, Tropical architecture

Topic	Content
1. Designing with real application principles	1.1 Designing to meet real client needs and on actual building locations in the rural and urban areas.
2. Commercial/Institutional Architecture	2.1 The design form and structural that has complex socio-cultural user-application 2.2 Designing to meet sustainability requirements and outcomes.
3. Complex Multiple Use Buildings	3.1 The design of buildings that suit large scale architectural forms and structures that are inspired by traditional and vernacular format.
4. Large scale Civic Architecture	4.1 Multiple level civic building in an urban context
5. Communal/Institutional Architecture	5.1 Large Scale Shopping Centre Development
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:
1. Prepare preliminary and design development for large scale and multi-purpose, buildings;
2. Lay out buildings and associated site-works to fit into the landscape as well as in harmonious relationship and/or in contradiction in bringing a meaning alternative to neighbouring buildings;
3. Make appropriate responses and provisions for local environmental, cultural and economic factors in designing.
4. Document and prepare specification requirements for at least one project in demonstrating technical comprehension and competence.
5. Prepare detailed designs for exterior and interior spaces of low rise, single to one story multi-purpose buildings;

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6. Utilise computer software to make orthographic (2D and 3D) drawings;

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1: (25%)**
- **Project 2: (25%)**
- **Final Project part A: (40%)**
- **Final Project part B: (10%)**

Assessment 1 - **Project 1: Design a Large Complex single level Commercial Building:** An Individual based project building up continuity from the final project undertaken in the previous semester addressing an elevated degree of building design requirements as set out in the project brief. The student is tasked, to prepare and project action plan and a schedule of activities to achieve the final design outcome, in a modern building format for medium complex commercial buildings

Assessment 2 - **Project 2: Design of a complex multiple level (3 maximum) Commercial/Institutional Building.** An Individual based design project in response to the project brief and design rubric in achieving design outcomes that expands architectural design creativity and promotes architectural design awareness of building and/or product outcome.

Assessment 3 - **Final Project: Design of an Urban multiple level Mix-Use (Civic-Commercial) Building.** A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for medium to complex scale public buildings.

Assessment 4 - **Semester Portfolio.** A compilation of all projects carried out in the semester in an A1 portfolio by each student.

Subject Textbook

- Watson, D.; & Crosbie, M. J. (2005) Time-Saver Standards for Architectural Design: Technical Data for Professional Practice. 8th Ed. McGraw-Hill, Singapore.

References

- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.

AR 312: MELANESIAN BUILT ENVIRONMENT

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Melanesian Built Environment
Subject Code: AR 312
Duration: 13 teaching weeks
Contact Hours: 7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points: 19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

The subject explores the concept of the built environment, and the liberal understanding of what it means to be an architect in a globalizing dynamically changing world. Contextually informed by the location in Papua New Guinea the student is exposed to the everyday narrative and interactive dynamics in broad systems perspective of the complex social-ecological system in and of the Melanesian built environment(s) – (Traditional and Modern) that is constantly in the making, its spatial and systemic changes, challenges and development in enhancing the quality of life. It analyses and determines the conditions of the emergence of this concept within the context of existing vernacular-built traditions and culture and the changing modern setting. It traces how these concepts and systems have changed through time, with the aim of enhancing our present understanding of the traditional built environments, the towns and cities and their regenerative social, cultural, environmental and economic challenges and changes. The course introduces the need to examine Melanesian Built Environment practices in past, the present and the future and in enabling sustainable development practices that embraces energy consciousness, public safety, health, liveability, pedestrian friendly, socio-economic equality, societal value, complex social-ecological system sustainability and Melanesian identity in the globalizing world.

Subject Topics

1. Introduction
2. The Built Environment
3. The Melanesian Built Environment(s)
4. Sustainable Built Environments
5. Architecture and Built environment
6. Sustainable Built Environment

Topic	Content
1. Introduction	1.1 Historical development of the built environment 1.2 The theories, principles and background of the development of built environments – a broad systems perspective.
2. The Built Environment	2.1 The development of the built environment in modern town planning practice and the formulation of policies to police and govern systemized urban growth and the complex social-ecological systems dynamics. 2.2 The growth and characterization, forces and systems that influence urban built environment growth and dynamics.
3. The Melanesian Built Environment(s)	3.1 The traditional Practices – socio-cultural mix and that which influence Patterns of built environment configuration. 3.2 The systematic transitional shift from traditional to assimilation and adaptation of modern practice. 3.3 The evolution of the Modern Melanesian Built Environment
4. Sustainable Built Environments	4.1 The changing dynamics of urban built environments
5. Architecture and Built environment	5.1 The role of architecture in promoting quality-built environments

6. Sustainable Built Environment	6.1 A Case Study

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Develop an understanding of the theories and principle dynamics that give rise to the broad systems perspective and the need for built environment outcomes.
2. Relate built environment growth to relative and complex socio-ecological systems and developmental forces.
3. Read the urban profile using various urban development theories, control, and governance instruments in promoting good liveable environments.
4. Identify different built environment development patterns and thinking that enable sustainable development practices.
5. Carryout simple to complex-built environment systems modelling and project outcomes that promote good urban development and community governance.
6. Integrate urban planning, urban design, urban architecture principles in arriving at liveable built environments.
7. Appreciate good built environments that promote healthy urban quality architecture and urban refinement.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (25%)**
- **Assignment 2: (25%)**
- **Test 1: (40%)**
- **Final Assessment Project: (10%)**

Assessment 1 - **Assignment 1:** Group-based research on the qualities and principles that promote good and healthy quality Built Environments. This will be presented in a class seminar.

Assessment 2 - **Assignment 2:** An individual research on the different inputs that enable and create good liveable built environments in both the traditional and modern Melanesian context.

Assessment 3 - **Test 1:** What promotes sustainable built environments?

Assessment 4 - **Final Assessment Project:** An individual research, documentation and presentation of an ideal Melanesian Built Environment.

Subject Textbook

- Salim, N. F. (2011) The Impact of Globalization on Architecture and Architectural Ethics. Common Ground Publishing Illinois USA
- Salim, N. F. (2011) Cultural Sustainability and Changing Worldview: Dilemmas of Architecture and the Built Form. Common Ground Publishing Illinois USA

References

- Coiffier C. (1982) *Architecture Melanesienne. UN Inventaire de L'Habitat Vernaculaire des Iles Melanesienne. Vol. 1; Jeanne-Marie Alexandroff de Buchere.*
- Jackson, R. (1972) Introduction to Urban Geography of Papua New Guinea – UPNG Press – Waigani Port Moresby PNG

AR 316: URBAN DEVELOPMENT

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Urban Development
Subject Code: AR 316
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

Firstly, to give the students an understanding of the historical developmental and growth patterns of settlements and the forces shaping urbanization, the theories, principles and background of to the development of human settlements, the phenomenon of urbanization, the principles and practice of urban planning and the forces that contributes towards urbanization and urban growth. The understanding of the origins and development of modern town planning practice and the formulation of policies to police and govern systemized urban growth.
Secondly, to develop the knowledge base required in urban planning as a tool to enhance and appreciate urban growth and people participation at the local context within a greater global community perspective.
Thirdly, embracing architecture as a holistic part of the urban fabric and expansion giving rise to spatial development of architecture.

Subject Topics

1. Introduction
2. Towns and Cities
3. Urbanization
4. Urban Governance
5. Architecture and Urban Development
6. Urban Land Use

Topic	Content
1. Introduction	1.1 Historical developmental and growth patterns of settlements and the forces shaping urbanization 1.2 The theories, principles and background of to the development of human settlements 1.3 The phenomenon of urbanization, the principles and practice of urban planning and the forces that contributes towards urbanization and urban growth
2. Towns and Cities	2.1 The origins and development of modern town planning practice and the formulation of policies to police and govern systemized urban growth. 2.2 The growth and characterization and forces that influence urban growth.
3. Urbanization	3.1 The definition of urbanization 3.2 The patterns of urbanization 3.3 The results of urbanization
4. Urban Governance	4.1 Tools and instruments of governance
5. Architecture and Urban Development	5.1 The role of architecture and urban development
6. Urban Land Use	6.1 The urban land use theory and application profile in the local context.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Develop an understanding of the essence of human settlement development.
2. Relate urban development to relative urban developmental forces.
3. Read the urban profile using various urban development theories and control and governance instruments.
4. Identify different urban growth (urbanizing) patterns in the global and local context in reference to principal growth theories and models.
5. Carryout simple to complex urban planning, development assessments, land use modelling and projects related to urban growth development.
6. Integrate urban planning principles in urban architectural projects and developments.
7. Appreciate urban planning as a tool for developing urban quality architecture and urbanity.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Test 1: (20%)**
- **Final Assessment Project: (40%)**

Assessment 1 - **Assignment 1:** Group-based research on the Historical developmental and growth patterns of settlements and the forces shaping urbanization and the growth and characterization and forces that influence urban growth**.**

Assessment 2 - **Assignment 2:** An individual task on the issue of urbanization, its influences and what it creates on a global, regional and local scale.

Assessment 3 - **Test 1:** The theories, principles and background of the development of human settlements, and the phenomenon of urbanization, the principles and practice of urban planning and the forces that contribute towards urbanization and urban growth.

Assessment 4 - **Final Assessment Project:** A group project on urban land use applications on the local experience

Subject Textbook

- Berke, R. P., Godschalk, R.D., Kaiser, J, E and Rodrigues A. D. (2006) Urban Land Use Planning 5th Ed. University of Illinois Press Chicago. USA

References

- Gehl, J. (2010) Cities for People. Island Press Washington. USA
- UN-Habitat (2016) Urbanization and Development: Emerging Future. World Cities Report 2016. United National Human Settlement Program (UN-Habitat) Nairobi, Kenya. www.unhabitat.org (world city Full Report 2016)
- Papua New Guinea Physical Planning Act

AR 317: ECOLOGICAL SUSTAINABLE DEVELOPMENT

Course: Bachelor of Architecture (NQF Level 8)
Subject Name : Ecological Sustainable Development
Subject Code: AR 317
Duration: 13 teaching weeks
Contact Hours: 7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points: 19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

This subject introduces the student to the concepts of Ecologically Sustainable Development (ESD). ESD is development which aims to meet the needs of people today, while conserving our ecosystems on which life depends, are maintained, for the benefit of future generations.

Sustainable development should be considered from the triple point of: economic development, social development, and environmental protection.

Sustainable design strategies for architects are highlighted. These are considered under the following headings: pre-design, siting and planning issues, concept design, material selection, energy, water, construction management, and building operation and management.

Subject Topics

1. What is ESD?
2. Sustainable Development
3. Sustainable design strategies for architects

Topic	Content
1. What is ESD?	1.1 Biodiversity 1.2 Resources 1.3 Pollution 1.4 Quality of life
2. Sustainable Development	1.1 Economic development 1.2 Social development 1.3 Environmental protection
3. Sustainable design strategies for architects	3.1 Pre-design 3.2 Siting and planning issues 3.3 Concept design 3.4 Material selection 3.5 Energy 3.6 Water 3.7 Construction Management 3.8 Building Operation & Management

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the nature of ESD, especially ecological systems that support life.
2. Explain the economic considerations involved in sustainable development.
3. Explain the social considerations involved in sustainable development
4. Explain the environmental protection considerations involved in sustainable development.
5. Identify and use sustainable design strategies available to the architect.

Assessment Tasks and Weightings
The assessment for this subject has two main parts: (i) continuous assessment worth 50%, and (ii) examination component worth 50%.
To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% (from 50% cont. assessment & 50% examination).

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (10%)**
- **Test: (20%)**
- **Assignment 2: (20%)**
- **Examination: (50%)**

Assessment 1 - **Assignment 1:** Identify the ecosystems that support life

Assessment 2 - **Test:** Explain the economic development, social development, and environmental protection aspects of sustainable development.

Assessment 3 - **Assignment 2:** Apply some of the sustainable design strategies on a design project. Coordinate with Studio-Design project.

Assessment 4 - **Examination:** This is a written examination given in Week 14, which covers all topics covered from Week 1 to 13. It is worth 50% of the total marks.

Subject Textbook

- BDP Environment Design Guide (2001) RAIA Environment Policy. GEN1. Canberra

References

- Pearce, A R et al (2018) Sustainable Buildings and Infrastructure 2nd Routledge, London
- DP Environment Design Guide (2001) RAIA Environment Policy – Supplementary Document: Sustainable Design Strategies for Architects. GEN1. Canberra

AR 320: ARCHITECTURAL DESIGN INTEGRATION CAPSTONE PROJECT VI

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Architectural Design Integration Capstone Project VI
Subject Code: AR 320
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) +(2.1 x 2) +(1.4 x 6)]
Delivery Mode: On campus
Prerequisites: AR310 Integrated Architectural Design V
Co-requisites:
Subject Coordinator: Design Studio Master

Synopsis

Designing a capstone architectural design project based on multiple level complex buildings for sites in both coastal and highland zones in the tropics, in varying depth addressing all stages of the design process, including: brief preparation, analyses, synthesis, site investigation, research and data collection relating to project type, preparation and evaluation of alternative spatial configurations and structural proposals, refinement of proposed solutions to developed design stage, and execution of high-quality presentation [with the option of using CAD production and presentation]. A design rubric is use in carrying out the final assessment/jury. Participation in scheduled Architecture seminars and Master-classes.

Subject Topics

1. Designing to Context
2. Commercial Architecture
3. Medium to Complex Multiple Use Buildings
4. Designing Residential Buildings
5. Communal Architecture
6. Design Integration

Topic	Content
1. Designing to Context	1.1 Designing to meet clientele and contextual requirements
2. Commercial Architecture	2.1 The design form and structural that has a complex and multiple user-application 2.2 Designing to meet sustainability requirements and outcomes.
3. Medium to Complex Multiple Use Buildings	3.1 The design of buildings that have a realistic architectural scale in form and structure that is inspired by traditional and vernacular format or modern contemporary architectural practice.
4. Designing Residential Buildings	1.1 Multiple level Residential Mix-Use Architecture with multiple interchangeable space usage
5. Communal Architecture	1.1 Design Multiple –Complex Community Public/Civic Architecture
6. Design Integration	6.1 Design, documentation, technology application, structural fitness, material usage and service installation in small, medium scale buildings.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Demonstrate a mature approach to complex architectural problems;
2. Design buildings of varied scale with a holistic understanding and demonstrating architectural aptitude and competence.
3. Design buildings, and spaces within buildings, to suit given parameters of socio-cultural transaction, architectural science fitness, structural soundness, and materials performance.
4. Documentation and specification requirements for the major project in demonstrating technical competence comprehension in a capstone project.
5. Independently carryout architectural design tasks (the design competency) and bring the project to a satisfactory completion within the provided design brief.
6. Realistically make a building design within the project budget.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 50% overall, 40% for the Final Project and 10% for the semester portfolio must be achieved. There is no final examination in this subject.).

Students must also refer to the Subject Assessment Details.

- **Capstone Project – Gate 1 & 2: (20%)**
- **Capstone Project – Gate 3 & 4: (30%)**
- **Capstone Project – Gate 5 & 6: (40%)**
- **Portfolio: (10%)**

Capstone Project - Final Project is a major Project designed to measure graduate competence at this level. A final architectural design project and presentation outlining and communicating the design processes, rationale and outcomes as required in the design rubric. The project will require a partial documentation of the design task in demonstrating competency in construction documentation for medium to complex scale public buildings.

Assessment 1 - **Capstone Project – Gate 1 & 2:** Assessment is carried out in two (2) preliminary gates to monitor progress and performance. Each gate has a cumulative assessment requirement. Each gate carries a 10% weighting. A design assessment rubric is used in assessment grade.

Assessment 2 - **Capstone Project – Gate 3 & 4:** Assessment is carried out in two (2) intermediate gates to monitor progress and performance. Each gate has a cumulative assessment requirement. Each gate carries a 15% weighting. A design assessment rubric is used in assessment grade.

Assessment 3 - **Capstone Project – Gate 5 & 6:** Gates 5 and 6 are conclusive finalizing phases of the undergraduate Capstone project each carrying 20% weighting. A design assessment rubric is used in the final assessment grade.

Assessment 4 - **Portfolio:** A compilation of all projects carried out in the final year in an A1 portfolio that carries 10% weighting.

Subject Textbook

- Watson, D.; & Crosbie, M. J. (2005) Time-Saver Standards for Architectural Design: Technical Data for Professional Practice. 8th Ed. McGraw-Hill, Singapore

References

- Leggitt., J. (2010) Drawing Shortcuts; Developing Quick Drawing Skills Using Today's Technology.
- Asla, M. L; (1993) Drawing and Designing with Confidence; A Step-By-Step Guide
- Tutt P. and Alder D., (1990) New Metric Handbook, Butterworth, Oxford.

AR 326: URBAN DESIGN THEORY

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Urban Design Theory
Subject Code: AR 326
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) +(2.1 x 2) +(1.4 x 6)]
Delivery Mode: On campus
Prerequisites: AR310 Integrated Architectural Design V
Co-requisites:
Subject Coordinator: Design Studio Master

Synopsis

The subject explores the idea of the city, and the major concepts related to urban life. It analyses and determines the conditions of their emergence within a broader cultural context. It traces how these concepts have changed through time, with the aim of enhancing our present understanding of cities and their regeneration. It follows the development of city planning and the establishment of planned, ideal cities as a political goal up to the foundation of new towns. In its dealing with historically modern cities, the presentation centres on case studies of cities representative of urbanism from the eighteenth to the twenty-first centuries, drawing lessons from the methods and types of documentation used in its development. The course also introduces the manner in which architecture has generated a number of spontaneous and critical responses to the demands of the city in the past four decades. The arguments are drawn from sources in architectural and urban theory, philosophy, art history, anthropology, literary sources and social sciences.

Subject Topics

1. Introduction
2. Urban Regeneration
3. The Influences of Urban Design
4. Urban Design Developments
5. Political and Conceptual Approach to city planning
6. Project Development

Topic	Content
1. Introduction	1.1 Urban Design Theory 1.2 The idea of the city, and the major concepts related to urban life. 1.3 Philosophies of urban design, architecture, the history of ideas, and the related disciplines of cultural studies, art and landscape studies, and their original application in contemporary debate
2. Urban Regeneration	2.1 Appraisals and judgements on spatial, aesthetic, technical and the social qualities of an urban design outcome(s) within the scope and scale of wider advanced environmental studies.
3. The Influences of Urban Design	3.1 Understand the complexity of influences on the contemporary built environment of individual buildings, the design of cities, transport infrastructure, past and present societies and wider global issues including climate change.
4. Urban Design Developments	4.1 Understand the development of major nineteenth and twentieth century cities, including new and theoretical cities. Appraisal and judgements about the nature of the physical development of these cities in the light of their historical, social, political and technological context
5. Political and Conceptual Approach to city planning	5.1 The influences on the development of cities on conceptual and political approaches to urban planning in the mid-twentieth century and beyond, until present.
6. Project Development	6.1 Theories, research and analysis to the ideas, development and quality of a project.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

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1. Demonstrate a systematic understanding, knowledge and critical awareness of current philosophies of urban design, architecture, the history of ideas, and the related disciplines of cultural studies, art and landscape studies, and their original application in contemporary debate.
2. Critically appraise and form considered judgements about spatial, aesthetic, technical and the social qualities of an urban design proposal within the scope and scale of wider advanced environmental studies.
3. Comprehensively understand the complexity of influences on the contemporary built environment of individual buildings, the design of cities, transport infrastructure, past and present societies and wider global issues including climate change.
4. Systematically understand the development of major nineteenth and twentieth century cities, including new and theoretical cities.
5. Critically appraise and form considered judgements about the nature of the physical development of these cities in the light of their historical, social, political and technological context.
6. Understand critically the influences on the development of these cities on conceptual and political approaches to urban planning in the mid-twentieth century and beyond, until present. Develop skills of understanding how big cities work and develop.
7. Creatively apply theories, research and analysis to the ideas, development and quality of a project. Communicate effectively using a range of communication skills. Comprehensively understand the nature of differing types of documentation used in planning and analysis.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Project must be achieved.
Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Test 1: (30%)**
- **Final Assessment Project: (30%)**

Assessment 1 -	**Assignment 1:** Group-based research on Urban Design Theory and the idea of the city, and the major concepts related to urban life. Philosophies of urban design, architecture, the history of ideas, and the related disciplines of cultural studies, art and landscape studies, and their original application in contemporary debate
Assessment 2 -	**Assignment 2:** An individual task on the spatial, aesthetic, technical and the social qualities of an urban design outcomes within the scope and scale of wider advanced environmental studies. Understanding the complexity of influences on the contemporary built environment of individual buildings, the design of cities, transport infrastructure, past and present societies and wider global issues including climate change.
Assessment 3 -	**Test 1:** The development of major nineteenth and twentieth century cities, including new and theoretical cities and the nature of the physical development of these cities in the light of their historical, social, political and technological context. The influences on the development of cities on conceptual and political approaches to urban planning in the mid-twentieth century and beyond, until present.
Assessment 4 -	**Final Assessment Project:** An urban design project in capturing the theories, research and analysis on the ideas, development and quality production of a project.

Subject Textbook

- Carmona, M., Tiesdell, S., Heath, T., and Oc, T. (2010) Public Places, Urban Spaces: The Dimensions of Urban Design 2nd Ed. Elsevier Singapore.

References

- Parakh, J., Gabel, J., and Safarik, D. (2017) The Space Between: Urban Places, Public Spaces and Tall Buildings. An output of the CTBUH Urban Habitat/Urban Design Committee. Chicago Council of Tall Buildings and Urban Habitat. USA
- Moughtin Cliff (2003) Urban Design, Streets and Square. 3rd Ed Butterworth-Heinemann Singapore.
- Gehl, J. (2010) Cities for People. Island Press Washington. USA
- UN-Habitat (2016) Urbanization and Development: Emerging Future. World Cities Report 2016. United National Human Settlement Program (UN-Habitat) Nairobi, Kenya. www.unhabitat.org (world city Full Report 2016)
  PNG Town Planning Act

AR 327: GREEN ARCHITECTURE

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Green Architecture
Subject Code: AR 327
Duration: 13 teaching weeks
Contact Hours: 7 [3 hrs + 2 hrs tutorial + 2hrs projects]
Credit Points: 19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode: On campus
Prerequisites: AR317 Sustainable Design
Co-requisites:
Subject Coordinator:

Synopsis

This subject introduces the student to the concepts of green architecture. In our endeavour to reduce the impacts of climate-change, architects must realise their contribution in promoting green building through design, construction, operations and maintenance solutions.

Architects must be able to gauge the performance of their building designs from the point of view of: energy savings, water efficiency, reduction of CO2, indoor environmental quality, and efficient use of resources.

Subject Topics

1. Introduction
2. Urban Regeneration
3. The Influences of Urban Design
4. Urban Design Developments
5. Political and Conceptual Approach to city planning
6. Project Development

Topic	Content
1. Sustainable Design & Construction	1.1 Sustainable features included in Design. 1.2 Sustainable construction practices.
2. Energy Use	2.1 Energy optimization. 2.2 Solar energy. Daylighting
3. Air Quality & Atmosphere	3.1 Indoor air quality
4. Water Use	1.1 Rainwater collection. Use of efficient water fixtures.
5. Indoor Environmental Impacts	5.1 Indoor air ventilation
6. Materials & Waste Impacts	6.1 Recycling of materials. Local products. Low embodied materials. Waste management.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Explain the role of green architecture in achieving sustainable development
2. Identify and use green building design strategies
3. Explain the role of green construction
4. The use of Life Cycle Assessment (LCA) in evaluating material and product sustainability
5. Explain the role of Green Building Councils
6. Identify the most popular Green Building Rating Systems used in the world today

Assessment Tasks and Weightings

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The assessment for this subject has two main parts: (i) continuous assessment worth 50%, and (ii) examination component worth 50%.

To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% (from 50% cont. assessment & 50% examination).

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (10%)**
- **Test: (20%)**
- **Assignment 2: (20%)**
- **Examination: (50%)**

Assessment 1 - **Assignment 1:** Group-based research on Urban Design Theory and the idea of the city, and the major concepts related to urban life. Philosophies of urban design, architecture, the history of ideas, and the related disciplines of cultural studies, art and landscape studies, and their original application in contemporary debate

Assessment 2 - **Assignment 2:** An individual task on the spatial, aesthetic, technical and the social qualities of an urban design outcomes within the scope and scale of wider advanced environmental studies. Understanding the complexity of influences on the contemporary built environment of individual buildings, the design of cities, transport infrastructure, past and present societies and wider global issues including climate change.

Assessment 3 - **Test 1:** The development of major nineteenth and twentieth century cities, including new and theoretical cities and the nature of the physical development of these cities in the light of their historical, social, political and technological context. The influences on the development of cities on conceptual and political approaches to urban planning in the mid-twentieth century and beyond, until present.

Assessment 4 - **Final Assessment Project:** An urban design project in capturing the theories, research and analysis on the ideas, development and quality production of a project.

Subject Textbook

- BDP Environment Design Guide (2001) RAIA Environment Policy. GEN1. Canberra

References

- Pearce, A R et al (2018) Sustainable Buildings and Infrastructure 2nd Ed Routledge, London.
- DP Environment Design Guide (2001) RAIA Environment Policy – Supplementary Document: Sustainable Design Strategies for Architects. GEN1. Canberra

AR 328: INTRODUCTION TO ARCHITECTURE PRACTICE AND MANAGEMENT

Course: Bachelor of Architecture (NQF Level 8)
Subject Name: Introduction to Architecture Practice and Management
Subject Code: AR 328
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

The subject exposes the students to Architectural Practice and Management as introductory orientation to the architectural competencies of Project Procurement Process and Practice Management. It positions students on the need to be proficient, timely and for cost-effective completion of an architectural project through all design and construction phases. The subject looks at Project Delivery types and the range of contractual obligations carried by architects, clients, consultants and contractors in the evaluation and implementation of procurement systems and appropriate contractual administration systems. The establishment and operation of project teams and formalizing of project agreements (such as with client, team/s and contractor) critical to competent project delivery. The subject also outlines the holistic understanding and organization of the business and profession of architecture in relation to delivering projects. This addresses the knowledge and execution of the processes needed in providing architectural services; knowing how to implement appropriate systems to establish and maintain an architectural practice; and knowing and enacting a broad range of ethical and legal obligations required of a Professional Practitioner.

Subject Topics

1. Project Delivery: Procurement I
2. Project Delivery: Procurement II
3. Project Delivery: Construction Stage I
4. Project Delivery: Construction Stage II
5. Project Delivery: Construction Stage III

Topic	Content
1. Project Delivery: Procurement I	1.1 Identifying available methods and assessment of relevance and application to a project. 1.2 Selection of procurement method, incorporates assessment of impact on all the phases of project including design, documentation and project delivery. 1.3 Selection of procurement method(s) incorporates assessment of the impact on contractual arrangements between all project stakeholders.
2. Project Delivery: Procurement II	2.1 Selection of procurement method(s) incorporates assessment of the impact on selection, contracting and scope of work of consultants and specialist service providers. 2.2 Preparation of report and recommendations to enable clients to make approval of a procurement method and all associated contracts. 2.3 Knowledge and application of all administration and principles for the selected procurement method and associated contracts.
3. Project Delivery: Construction Stage I	3.1 Selection process for appropriately qualified contractors is in accordance with the procurement method and project contract. 3.2 Recommendations regarding contractor selection and specifics of project contract are made to the client for their approval.
4. Project Delivery: Construction Stage II	4.1 Identification and application of the process and administration systems needed to fulfil all obligations under project contract.

	4.2 Construction progress and quality is systematically reviewed and monitored as required under the contract provisions. 4.3 Identification and application of all relevant processes required for certification of monetary claims, project variations, extensions of time, project instructions or other administrative responsibilities under the contract provisions.
5. Project Delivery: Construction Stage III	5.1 Monitoring project requirements and objectives as described in project documents are met. 5.2 Identification and application of appropriate and consistent systems for record keeping and maintenance of document revisions.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Identify available methods and assessment of relevance and application to a project. Select appropriate procurement methods, and incorporate assessment of impact on all the phases of the project including design, documentation and project delivery.

2. Select appropriate procurement method(s) and incorporate assessment of the impact on contractual arrangements between all project stakeholders. Select the right procurement method and incorporate assessment of the impact on selecting, contracting and scope of work of consultants and specialist service providers.

3. Prepare the needed report and recommendations to enable the client to make approval of the procurement method and all associated contracts. Know and apply the administration and principles for the selected procurement method and associated contracts.

4. Select an appropriate process for appropriately qualified contractors in accordance with the procurement method and project contract. Make recommendations regarding contractor selection and specifics of project contract to the client for their approval.

5. Identify and apply the process and administration systems needed to fulfil all obligations under project contract. Monitor the construction progress and enable quality systematic review required under the contract provisions.

6. Identify and apply all relevant processes required for certification of monetary claims, project variations, extensions of time, project instructions or other administrative responsibilities under the contract provisions.

7. Monitor and meet all project requirements and objectives described in project documents. Identify and apply appropriate and consistent systems for record keeping and maintenance of document revisions.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Project must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Test 1: (20%)**
- **Major Project: (40%)**

Assessment 1 - **Assignment 1:** A group task in identifying available methods and assessment of relevance and application to a project. Selecting of procurement method(s) incorporates assessment of the impact on contractual arrangements between all project stakeholders. Selecting of procurement method(s) incorporates assessment of the impact on selection, contracting and scope of work of consultants and specialist service providers.

Assessment 2 - **Assignment 2:** An individual task in the preparation of report(s) and recommendations to enable clients to make approval of procurement methods and all associated contracts. Knowledge and application of all administration and principles for the selected procurement

	method and associated contracts. Selection process for appropriately qualified contractors is in accordance with the procurement method and project contract. Recommendations regarding contractor selection and specifics of project contract are made to the client for their approval.
Assessment 3 -	**Test 1:** Identification and application of the process and administration systems needed to fulfil all obligations under project contract. Construction progress and quality and systematic review and monitoring required under the contract provisions. Identification and application of all relevant processes required for certification of monetary claims, project variations, extensions of time, project instructions or other administrative responsibilities under the contract provisions.
Assessment 4 -	**Major Project:** Monitoring project requirements and objectives as described in project documents. Identification and application of appropriate and consistent systems for record keeping and maintenance of document revisions.

Subject Textbook

- Chappell, D., and Dunn, M., (2016) The Architect in Practice. 8th Ed. Wiley Blackwell. UK

References

- Franklin, J., R. (2000) Architect's Professional Practice Manual. McGraw-Hill, Singapore.
- Winkler, G., and Chiumento, C. G., (2009) Construction Administration for Architects. McGraw-Hill, Singapore.

AR 319: ARCHITECTURE DESIGN RESEARCH I

Course:	Bachelor of Architecture (NQF Level 8)
Subject Name:	Introduction to Architecture Practice and Management (Elective I)
Subject Code:	AR 319
Duration:	13 teaching weeks
Contact Hours:	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points:	21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode:	On campus
Prerequisites:	
Co-requisites:	
Subject Coordinator:	TBA

Synopsis

Architectural Design is an outcome of skill, talent and importantly how the designers are able to use and utilize, integrative framework to create spaces and structures that are lived and experienced by people of different experiences, exposures and requirements with an interdisciplinary perspective and input. The contribution of architectural design outcomes must relate to societal expectation, which is informatively captured through qualitative and quantitative research, assessment and evaluations by a number of interests – co-designers and related/associated professionals and disciplines in the built environment. This provides a greater and deeper informed understanding of the need to design buildings and structures that enables and complements society's needs. Therefore, this course is designed to develop research and presentation skills in specialised study area of interest to the staff and the student in and that which will become useful in real practice environments such research areas of:

1. 3D-CAD modelling, rendering and slide presentation, introduction to macro-design programming;
2. Traditional architectural and settlement patterns through the Architecture Heritage Centre;
3. Contemporary studies in urban settlements and low-cost housing solutions;
4. Advanced problems in Tropical Architecture, and Architectural Science
5. Post Occupancy Evaluation Study.
6. Specific Building Product Research and Development
7. Other Research Interest Related to quality design outcomes.

Subject Topics

1. Theories and understanding of different research concepts, and techniques and methodologies of architectural and built environment research.
2. Planning and selection of research with reference to theories, concepts and methods of research application.
3. On field and physical research exposure to hard elements architectural and built environment data experience
4. Working with data and analysis and referencing theories and concepts and applied methodologies.
5. Credible research outcome, presentation and application that embraces social, cultural identity that blends ecological and scientific sustainable built environment outcomes

Topic	Content
1. Theories and understanding of different research concepts, and techniques and methodologies of architectural and built environment research.	1.1 Identifying prevalent theories, concepts, methodologies and techniques of architectural and built environment research. 1.2 Selection and expounding on specific research, techniques and methods that are appropriate and relevant to current practice. 1.3 1.4 Expected architectural by-product of research outcomes and expectation in the built environment.

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2. Planning and selection of research with reference to theories, concepts and methods of research application.	**2.1** Planning and selection of research. 2.2 Modelling research type 2.3 Research Application.
3. On field and physical research exposure to hard elements architectural and built environment data experience	3.1 On site Ethnographic Research/Engagement 3.2 Nature and Hard Elements of Architectural and Built Environment Research
4. Working with data and analysis and referencing theories and concepts and applied methodologies.	4.1 The Adding Value to Architectural and Built Environment Research 4.2 Translating Research to Application
5. Credible research outcome, presentation and application that embraces social, cultural identity that blends ecological and scientific sustainable built environment outcomes	5.1 Credibility of Design Research 5.2 Socio-cultural sensitivity of Design Research.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Develop a pluralist understanding and identifying prevalent theories, concepts, methodologies and techniques of architectural and built environment research.
2. Informed selection and expounding on specific research, techniques and methods that are appropriate and relevant to practice. Expected architectural by-product of research.
3. Modelling research type and application.
4. Ethnographic Engagement and related to the nature and hard elements research pursued.
5. Add value to architectural and built environment research in application
6. Be able to produce credible research proposals and be aware and display skills in integrating architectural designs (such as a nominated known building, or, a suitable studio design project) and built environment concepts, and elements.
7. Pursue a program of supervised study; and be able to meaningfully utilize advanced, culturally conscious and ecologically sensitive, approaches to architectural design, space manipulation, architectural fitness, and ecology.
8. Present oral and written discourses on the selected study topic.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Project must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Project: (20%)**
- **Major Project: (40%)**

Assessment 1 - **Assignment 1:** A group task in identifying available theoretical constructs and concepts of Architectural Design applied in different design tasks.

Assessment 2 - **Assignment 2:** An individual task in preparing a report and presentation of a finding on selected Architectural and/or built environment research model, concept and methodology.

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contractor selection and specifics of the project contract are made to the client for their approval.

Assessment 3 - **Test 1:** An individual project on a medium scale architectural design project that applies all the principles and concepts that enable a positive contribution to an expected outcome that adds value in the context of application.

Assessment 4 - **Major Project:** An individual Major Semester Research Project in a written, documented and oral presentation

Subject Textbook

- Edith C. (1999) Programming for Design: from theory to practice: John Wiley and Sons Inc., NY

References

- Thadani, D. A. (2010) The Language of Towns and Cities: A Visual Dictionary. Rozzoli NY.
- Florence, P. (2020) Thinking the Sculpture Garden: Art, Plant Landscape. 1st Ed. Routledge. NY
- Preiser,W.F.E.; Rabinowitz, H.Z.; and White, E. T. (1988) Post-Occupancy Evaluation. Van Nostrand Reinhold, NY.
- Winkler, G., and Chiumento, C. G., (2009) Construction Administration for Architects. McGraw-Hill, Singapore.

AR 329: ARCHITECTURE DESIGN RESEARCH II

Course: Bachelor of Architecture (NQF Level 8)
Subject Name : Introduction to Architecture Practice and Management (Elective II)
Subject Code: AR 329
Duration: 13 teaching weeks
Contact Hours: 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points: 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode: On campus
Prerequisites:
Co-requisites:
Subject Coordinator: TBA

Synopsis

Architectural Design is an outcome of skill, talent and importantly how the designers are able to use and utilize an integrative framework to create spaces and structures that are lived and experienced by people of different experiences, exposures and requirements with an interdisciplinary perspective and input. The contribution of architectural design outcomes must relate to societal expectation, which is informatively captured through qualitative and quantitative research, assessment and evaluations by a number of interests – co-designers and related/associated professionals and disciplines in the built environment. This provides a greater and deeper informed understanding of the need to design buildings and structures that enables and complements society's needs. Therefore, this course is designed to develop research and presentation skills in specialised study area of interest to the staff and the student in and that which will become useful in real practice environments such research areas of:

1. 3D-CAD modelling, rendering and slide presentation, introduction to macro-design programming;
2. Traditional architectural and settlement patterns through the Architecture Heritage Centre;
3. Contemporary studies in urban settlements and low-cost housing solutions;
4. Advanced problems in Tropical Architecture, and Architectural Science
5. Post Occupancy Evaluation Study.
6. Specific Building Product Research and Development
7. Other Research Interest Related to quality design outcomes.

Subject Topics

1. Theories and understanding of different research concepts, and techniques and methodologies of architectural and built environment research.
2. Planning and selection of research with reference to theories, concepts and methods of research application.
3. On field and physical research exposure to hard elements architectural and built environment data experience
4. Working with data and analysis and referencing theories and concepts and applied methodologies.
5. Credible research outcome, presentation and application that embraces social, cultural identity that blends ecological and scientific sustainable built environment outcomes

Topic	Content
1. Theories and understanding of different research concepts, and techniques and methodologies of architectural and built environment research.	1.1 Identifying prevalent theories, concepts, methodologies and techniques of architectural and built environment research. 1.2 Selection and expounding on specific research, techniques and methods that are appropriate and relevant to current practice. 1.3 Expected architectural by-product of research outcomes and expectation in the built environment.
2. Planning and selection of research with reference to theories, concepts and methods of research application.	**2.1** Planning and selection of research. **2.2** Modelling research type **2.3** Research Application.
3. On field and physical research exposure to hard elements	3.1 On site Ethnographic Research/Engagement

	architectural and built environment data experience	3.2 Nature and Hard Elements of Architectural and Built Environment Research
4.	Working with data and analysis and referencing theories and concepts and applied methodologies.	4.1 The Adding Value to Architectural and Built Environment Research 4.2 Translating Research to Application
5.	Credible research outcome, presentation and application that embraces social, cultural identity that blends ecological and scientific sustainable built environment outcomes	5.1 Credibility of Design Research 5.2 Socio-cultural sensitivity of Design Research.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Develop a pluralist understanding and identifying prevalent theories, concepts, methodologies and techniques of architectural and built environment research.
2. Informed selection and expounding on specific research, techniques and methods that are appropriate and relevant to practice. Expected architectural by-product of research.
3. Modelling research type and application.
4. Ethnographic Engagement and related to the nature and hard elements research pursued.
5. Add value to architectural and built environment research in application
6. Be able to produce credible research proposals and be aware and display skills in integrating architectural designs (such as a nominated known building, or, a suitable studio design project) and built environment concepts, and elements.
7. Pursue a program of supervised study; and be able to meaningfully utilize advanced, culturally conscious and ecologically sensitive, approaches to architectural design, space manipulation, architectural fitness, and ecology.
8. Present oral and written discourses on the selected study topic.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Project must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1: (20%)**
- **Assignment 2: (20%)**
- **Project: (20%)**
- **Major Project: (40%)**

Assessment 1 - **Assignment 1:** A group task in identifying available theoretical constructs and concepts of Architectural Design applied in different design tasks.

Assessment 2 - **Assignment 2:** An individual task in preparing a report and presentation of a finding on selected Architectural and/or built environment research model, concept and methodology. contractor selection and specifics of the project contract are made to the client for their approval.

Assessment 3 - **Test 1:** An individual project on a medium scale architectural design project that applies all the principles and concepts that enable a positive contribution to an expected outcome that adds value in the context of application.

Assessment 4 - **Major Project:** An individual Major Semester Research Project in a written, documented and oral presentation

Subject Textbook

- Pearce. A.R. Ahn, H. Y and HanmiGlobal (2018) Sustainable Buildings and Infrastructure: Paths to the Future. 2nd Ed. Routledge, NY

References

- Edith C. (1999) Programming for Design: from theory to practice: John Wiley and Sons Inc., NY
- Groat, L. and Wang, D. (2002) Architectural Research Methods. John Wiley and Sons, Inc. Canada
- Preiser, W.F.E.; Rabinowitz, H.Z.; and White, E. T. (1988) Post-Occupancy Evaluation. Van Nostrand Reinhold, NY.

- Salim, N. F. (2011) The Impact of Globalization on Architecture and Architectural Ethics. Common Ground Publishing Illinois USA
- Salim, N. F. (2011) Cultural Sustainability and Changing Worldview: Dilemmas of Architecture and the Built Form. Common Ground Publishing Illinois USA

COURSE STRUCTURE
BACHELOR IN CONSTRUCTION MANAGEMENT

First Year First Semester

Code	Subject	Contact Hours	Credit
CM 110	Introduction to Construction Mgt.	10	21
AR 111	Computer Aided Design	10	21
AR 119	Introd. to Research in Arch & Const Mgt	6	15
AR 117	Building Science	7	19
CM117	Construction Drawings	10	21
		43	**97**

First Year Second Semester

CM 121	Construction Technology I	10	21
CM 126	Construction Surveying	6	15
CM 128	Construction Law	4	16
CM 124	Construction Economics I	7	19
		27	**71**

Second Year First Semester

Code	Subject	Contact Hours	Credit
CM 210	Quantities Surveying and Estimating I	10	21
CM 212	Construction Management I	10	21
AR 214	Structures	10	21
AR 213	Building Systems I	10	21
		40	**84**

Second Year Second Semester

AR 220	Quantities Surveying and Estimating II	10	21
AR 223	Building Systems II	10	21
CM 222	Construction Management II	10	21
AR 221	Construction Technology II	4	16
		34	**79**

Third Year First Semester

Code	Subject	Contact Hours	Credit
CM 310	Quantities Surveying and Estimating III	10	21
CM 312	Construction Management III	10	21
CM 314	Construction Economics II	10	21
CM 311	Construction Technology III	10	21
		40	**84**

Third Year Second Semester

CM 320	Quantities Surveying and Estimating IV	10	21
CM 322	Construction Management IV	10	21
CM 328	Contract Administration	10	21
CM 324	Construction Economics III	10	21
		40	**84**

Fourth Year First Semester

Code	Subject	Contact Hours	Credit
CM 410	Project Dynamics 1	10	21
CM 412	Project Management	10	21
CM 414	Construction Economics IV	10	21
CM 419	Built Environment Research I	10	21
		40	**84**
Fourth Year	**Second Semester**		
CM 420	Project Dynamics II	10	21
CM 421	Facilities Management	10	21
CM 422	Construction Management V	10	21
CM 429	Built Environment Research II	10	21
		40	**84**

Relevant University Rules, Policies and Guides

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

Student Workload

The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Relevant Unitech Policies

1. Principles and Guidelines for Student Assessment
2. Summary of Examination Regulations 1026
3. Procedure for Compiling Examination Results
4. Procedure for Releasing Examination Results
5. Cheating in Assessment Items

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Graduate Statement (GS)

Bachelor of Construction Management graduates are capable of managing projects, building cost and construction through innovation, entrepreneurial, and effective communication skills. They will demonstrate professionalism and understanding of legal, environment and societal requirements through sustainable practices.

Course Learning Outcomes (CLOs)

The Construction Management study must be balanced between the theoretical and practical aspects of construction management training and shall ensure that the graduate, on completion student will:

CLO 1	Possess the knowledge required for professional practitioners within the discipline of construction management.
CLO 2	Create innovative solutions to complex construction problems within sustainable and whole of life constraints.
CLO 3	Source and analyse contemporary information for application in construction management.
CLO 4	Possess an in depth understanding of the broad spectrum of practice within the construction management industry.
CLO 5	Communicate appropriately through multi mediums to a broad array of construction stakeholders and the wider community audience.
CLO 6	Cognisant of the societal restraints of construction within the context of diverse communities under remote and inaccessible conditions.
CLO 7	Capability to lead and participate in diverse teams and communicate effectively to achieve as practice outcomes.

CLO 8	Committed to personal and professional development and an in-depth knowledge and appreciation of sustainable practice and ethical behaviour.

THE BACHELOR OF CONSTRUCTION MANAGEMENT PROGRAM

CM 110: INTRODUCTION TO CONSTRUCTION MANAGEMENT

Course(s) Bachelor of Construction Management (NQF Level 8)
Subject Name Introduction to Construction Management
Subject Code CM 110
Duration 13 Teaching weeks
Contact Hours 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode On campus
Prerequisites Nil
Co-requisites None

Subject Coordinator TBA

Synopsis
To introduce the nature and principles of management and provide an understanding of the role of management in construction.

Subject Topics
1. Introduction of the nature of the construction industry
2. The types of clients who require construction services
3. The internal structure of various construction organisations and levels of responsibility within them
4. Elementary business practices

Subject Outline

Topic	Content
1. Introduction of the nature of the construction industry.	1.1 What is Management 1.2 Industry Structure
2. The types of clients who require construction services	2.1 What is a client 2.2 Clients' needs and requirement 2.3 Meeting client requirements
3. The internal structure of various construction organizations and levels of responsibility within them	3.1 What is an organization? 3.2 Types of structure 3.4 Levels of management 3.5 Planning and controlling 3.6 Implementation

4. Elementary business practices	4.1 Types of businesses 4.2 Marketing 4.3 Financial Management

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Understand the structure of the construction industry;
2. Understand and know how best to serve the client in the identification of needs and requirements for the client;
3. Prepare and interpret organisation charts for small and medium businesses;
4. Explain and comment on the fundamental statutes regulating the formation and running of construction businesses;
5. Understand the significance of financial management and application in construction business
6. Prepare a marketing strategy for a construction business

Assessment Tasks and Weightings

The assessment for this subject has two main parts: (i) continuous assessment worth 60%, and (ii) examination component worth 40%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20 %)**
- **Test 1 (20%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the nature of the construction industry and how business in the industry is conducted. The sectors of the industry and the participants including the client are identified. The nature of the project which forms the basis of business in the industry is identified and discussed. The assignment is assessed by an assessment rubric.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the principles of management and its applications in a building project and business. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The type of business to be formed and its organization structure will be prepared. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Text book

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

CM 117: CONSTRUCTION DRAWINGS

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Drawings
Subject Code	CM 117
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x 2.1) + (6 x 1.4)]
Delivery Mode	On campus
Prerequisites	Grade 12 'A' Entry
Co-requisites	None
Subject Coordinator	TBA

Synopsis

This subject provides an introductory lecture for students in the discipline of construction technology. It allows the students to demonstrate foundation skills in architectural drawing of simple floor plans, elevations and sections; identify types, uses and standard sizes of building materials; carry out quantity surveying and estimating of simple buildings; planning, surveying and setting-out and profiling of a simple building plan; workshop practice in working with tools in constructing a model or furniture; site visits to construction sites and selected materials manufacturers/suppliers to observe and report on the range and properties of construction materials currently on the market.

Subject Topics

1. Introduction to architectural drawings
2. Scales in architectural drawing
3. Building materials; Types and uses
4. Introduction to quantity surveying and estimating
5. Set-out and profiling of a building plan
6. Workshop practice and safe work practices

Subject Outline

Topic	Content
1. Introduction to architectural drawings	1.1 Free hand sketching 1.2 Line works, shading and rendering 1.3 Orthographic drawings
2. Scales in architectural drawing	2.1 Understanding architectural scales 2.2 How to use a scale rule. 2.3 Working out the scales 2.4 Working with scales for architectural representation 2.5 Use of scales in orthographic drawings
3. Building materials; Types and uses	3.1 Types of building materials 3.2 Properties and uses of building materials 3.3 Standard sizes of building materials in construction
4. Introduction to quantity surveying and estimating	4.1 Girth/perimeter calculation of simple figures/polygons 4.2 Area calculations of simple figures/polygons 4.3 Volume calculations of simple figures/polygons 4.4 Take off of materials from simple building plans
5. Set-out and profiling of a building plan	5.1 Identify a simple building plan 5.2 Survey and planning of the site 5.3 Set out the process involved in setting out 5.4 Apply the 3.4.5 rule to square the building

6. Workshop practice and safe work practices	6.1 Identify types of workshop tools 6.2 Application of workshop tools 6.3 Apply safe work practices (OHS)

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Draw a simple building with floor plan, elevations, section and details
2. Apply the correct scale ratios in architectural drawings
3. Identify types, standard sizes and uses of building materials
4. Estimate the quantity of materials for a simple building plan
5. Survey, plan, set-out and square a building plan
6. Construct a model or furniture based on simple designs

Assessment Tasks and Weightings

The assessment for this subject is a continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. There is no final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Project 1 (25 %)**
- **Project 2 (25%)**
- **Project 3 (25%)**
- **Project 4 (25%)**

Assessment 1 - **Project 1:** This is an individual student project which requires the student to draw a simple architectural drawing consisting of a floor plan, elevations, sections and details and applying drawing scale ratios. The project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject.

Assessment 2 - **Project 2:** This is an individual student project which requires the student to take off the quantity of building materials from a simple architectural drawing plan. The project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject.

Assessment 3 - **Project 3:** This will be a group student project which requires groups of students to plan, survey and construct a site set out of a building plan. The project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject.

Assessment 4 - **Project 4:** This will be a group or individual student project which requires individual students or groups to use workshop carpentry tools to construct furniture or build a model based on their design. The project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject

Subject Text book

- Australian Standard Method of Measurement of Building Works (5th Edition), Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia (1991)
- Marsden, P.K. (1998) Basic Building Measurement, UNSW Press, Kensington, Australia
- Bond, G., Civil engineering drafting, UNITECH Printery, Lae

References

- Chudley, R, (2013) Building Construction Handbook, Routledge, Oxford, UK
- Tutt, P., Adler, (1990) D., New Metric Handbook, Architectural Press, London, UK
- Everett, A., Barritt, (2013) C. M. H., Materials (Mitchell's Building Series) 5th Edition, Routledge, New York, USA

AR 119 Introduction to Research in Architecture and Construction Management

Course: Bachelor in Construction Management (NQF Level 8)
Subject Name: Introduction to Research in Architecture and Construction Management
Subject Code: AR 119
Duration: 13 teaching weeks
Contact Hours: 6 [*2hrs Lectures + 2hrs Tutorials + 2hrs Project*]
Credit Points: 15 [(2x4.2) + (2x1.4) + (2x2.1)]
Delivery Mode: Lectures
Prerequisites:
Co-requisites:
Subject Co-ordinator:

Synopsis:
This subject introduces the main concepts of research in Architecture and Construction Management. It offers firm basic understanding of producing good research proposal and on how to undertake research successfully. This subject is structured systematically to meet the aim of producing good research proposal through the understanding of the concept of research, different classifications of research, theories and paradigms, various research styles, quantitative and qualitative approaches and to know where to begin research. The subject sessions will be made up of lectures, in class discussions, exercises and projects on the concept and approaches of research in construction necessary to achieve the subject aims.

Subject Topics:

Themes:	Topic Details:
1. Concept of research	1. Research: A careful search and investigation 2. Research: Contribution to knowledge 3. Research: A learning process 4. Contextual factors affecting research
2. Classifications of research	1. Pure and applied research 2. Quantitative and qualitative research 3. Other categories of research
3. Theories and paradigms	1. Development of knowledge 2. Testing a theory 3. A paradigm 4. Positivism 5. Interpretivism 6. Models and hypotheses
4. Research styles	1. Action research 2. Ethnographic research 3. Surveys 4. Case studies 5. Experiments
5. Quantitative and qualitative approaches	1. Quantitative approaches 2. Qualitative approaches 3. Triangulated studies 4. Data sources
6. Research methodology	1. Research topic selection 2. Refining research topic 3. Developing research proposal

Subject Learning Outcomes (SLO):
Upon completion of this subject, students will be able to:

1. Understand general concept of research in Architecture and Construction Management.
2. Understand various classifications of research and its application to Architecture and Construction Management
3. Understand theories and paradigms of research in Architecture and Construction Management.
4. Understand different research styles and strategies in Architecture and Construction Management.
5. Understand Quantitative and qualitative research approaches in Architecture and Construction Management.
6. Understand the Research Methodology in Architecture and Construction Management

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Assessment Tasks and Weightings:
The assessment for this subject is a continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. There is no final examination in this subject.
Unit assessment consists of one (1) Test, two (2) Assignments and one (1) Project as shown below.

Assessable Tasks		Assessment Descriptions	Weightings
1	Assessment 1 (Assignment 1)	This will be an individual student assignment which requires the student to identify and classify different types of research, theories and research styles. The assignment is assessed by an assessment rubric and contributes 10% towards the final grade for the subject	10%
2	Assessment 2 (Test 1)	This will be an individual student test which test the student of the level of knowledge learnt from Topic themes; Concept, Classification, Theories and paradigms of research. The Test contributes 25% towards the final grade for the subject.	25%
3	Assessment 3 (Test 2)	This will be an individual student test which test the student of the level of knowledge learnt from Topic themes; Research styles, Quantitative and qualitative approach, and Research methodology. The Test contributes 25% towards the final grade for the subject.	25%
4	Assessment 4 (Project 1)	This will be a group or individual student project which requires individual student or groups to produce a Research proposal on their selected research topic. The project is assessed by an assessment rubric and contributes 40% towards the final grade for the subject.	40%
Total:			100%

Student Workload:
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 13week semester with 12 weeks of teaching as per the PNG National Qualification Framework.

Subject Text:
Fellows, R., & Liu, A. (2015). Research Methods for Construction (4th ed.). John Wiley & Sons Ltd, West Sussex, UK

References:
Lucas, Ray, and Raymond Lucas. Research methods for architecture. Hachette UK, 2016.

Aksamija, Ajla. Research Methods for the Architectural Profession. Routledge, 2021.

AR117: BUILDING SCIENCE

Course(s)	Architecture (NQF Level 8)
Subject Name	Building Science
Subject Code	AR117
Duration	13 weeks
Contact Hours	7 [3hrs lectures+2hrs tutorials+2hrs project]
Credit Points	19 [(4.2 x 3) + (2.1 x 2) + (1.4 x 2)]
Delivery Mode	Lectures
Prerequisites	Grade 12 'A' Entry
Co-requisites	None
Subject Coordinator	TBA

Synopsis

This subject introduces students to the crucial relationship between climate, man, and buildings. The subject allows students to realise that human beings are able to achieve their maximum productivity levels when they work in conducive atmospheric environments. Human beings assess their environments through their senses. Hence, students are introduced to important concepts such as climate, thermal comfort, thermal performance of buildings, lighting, and acoustics.

Subject Topics

1. Thermal Performance of Buildings
2. Lighting
3. Room Acoustics & Noise Control

Topic	Content
1. Thermal Performance of Buildings	1.1 Why does man build? 1.2 Relationship between climate, man, & buildings 1.3 Thermal comfort 1.4 Thermal quantities 1.5 Heat transfer (heat gain, heat loss)
2. Lighting	2.1 Photometric concepts 2.2 The human eye 2.3 Colours 2.4 Objectives of lighting 2.5 Natural daylighting 2.6 Artificial lamps
3. Room Acoustics & Noise Control	3.1 Room Acoustics 3.2 Acoustics for speech 3.3 Clarity & Power 3.4 Noise Control 3.5 Strategies to address external & internal noise

Subject Learning Outcomes (SLOs)

On completion of this subject, students will be able to:

1. Describe the major climatic types of the world
2. Describe the relationship between climate, man, and buildings and its effects on thermal comfort.
3. Explain basic thermal properties of building materials

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4. Identify main heat sources affecting heat transfer in buildings.
5. Explain important concepts related to good lighting design
6. Discuss the main concerns in room acoustics & noise control

Assessment Tasks and Weightings

The assessment for this subject has two main parts: (i) continuous assessment worth 60%, and (ii) examination component worth 40%.

To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% (from 60% cont. assessment & 40% examination).

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20 %)**
- **Test (20%)**
- **Assignment 2 (20%)**
- **Examination (40%)**

Assessment 1 - **Assignment 1:** a) Identify the major climatic zones and (b) Describe the relationship between climate, man, and buildings

Assessment 2 - **Test:** Thermal comfort, Heat transfer, Heat Loss, & Heat Gain

Assessment 3 - **Assignment 2:** Lighting and acoustics

Assessment 4 - **Examination:** This is a written examination given in Week 14, which covers all topics covered from Week 1 to 13. It is worth 40% of the total marks.

Subject Text book

- Moore, F (1993) Environmental Control Systems: Heating Cooling Lighting, McGraw-Hill Inc, New York
- Julian, W (1983) Lighting: Basic Concepts. Dept of Architectural Science. University of Sydney

References

1. Greenland, J. (1991) Foundations of Architectural Science. Faculty of Design Architecture and Building. University of Technology Sydney.
2. Moore, J.E (1978) Design for Good Acoustics and Noise Control. The MacMillan Press Ltd, London
3. Koenigsberger, O.H, Ingersoll, T.G, Mayhew, A, Szokolay, S.V (1973) Manual of Tropical Housing and Building. Longman Group Ltd, London

AR111: COMPUTER AIDED DESIGN (CAD)

Course(s) Bachelor of Construction Management (NQF Level 8)
Subject Name Computer Aided Design (CAD)
Subject Code AR111
Duration 13 Teaching weeks
Contact Hours 10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points 21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode Lectures and Laboratory
Prerequisites
Co-requisites
Subject Coordinator TBA
Synopsis

Developing introductory or basic and intermediate skills in the use of architectural design and drafting software with the assistance of computer aided design (CAD) tools. CAD is now a widely used tool that allows for the easier development of architectural design and design management integration. Students will be allowed to work with basic CAD tools that will prepare them to grasp the principles of 2D drafting and 3D drafting with the use of selected CAD software.

Subject Topics

1. Introduction to CAD and Terminologies
2. Drafting Concepts of CAD software
3. Basic Concepts in 2D CAD Application
4. Intermediate Concepts in CAD Application
5. Advance Concepts in CAD Application
6. CAD Animation and Application

Subject Outline

Topic	Content
1. Introduction to CAD and Terminologies	1.1 Why CAD in Architecture? 1.2 What is Computer Aided Design (CAD)? 1.3 Setting Up CAD software on a Personal Computer (PC) and computer requirements. 1.4 Basic CAD Software User Interface and CAD Terminologies.
2. Drafting Concepts of CAD software	2.1 Comparison between Manual Drafting and Digital Drafting in Architecture. 2.2. CAD as a tool in Design. 2. 3 Drafting in CAD and Basic User Commands.
3. Basic Concepts in 2D CAD Application	3.1 What is two-dimensional (2D) Drafting? 3.2 2D Drafting in CAD and Basic User 2D Commands. 3.3 Exploring 2D Commands in CAD.
4. Intermediate Concepts in CAD Application	4.1 Understanding 2D Editing tools and Modify CAD Commands 4.2 Exploring 2D Editing Concepts and their Application to Architectural CAD.
5. Advance Concepts in CAD Application	5.1 Understanding 3D Editing tools and Modify CAD Commands. 5.2 Exploring 3D Editing Concepts and their Application to CAD Projects.
6. CAD Animation and Application	6.1 Understanding 3D Animation Editing and Modify CAD Commands 6.2 Application of 3D CAD Animation Editing and their Application to CAD Projects.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Undertake CAD terminologies;
2. Use CAD Commands to do Architectural Drafting.
3. Demonstrate competency in selected CAD Software
4. Work with architectural design and selected CAD drafting software;
5. Produce 2D architectural documentation.
6. Produce 3D architectural presentation

Assessment Tasks and Weightings

The assessment for this subject is a continuous assessment worth 100%,
To obtain a pass grade in this subject, a 50% overall must be scored from the total weighting of 100. An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(10%)**
- **Assignment 2** **(10%)**
- **Test 1** **(20%)**
- **Project 1** **(20%)**
- **Project 2** **(40%)**

Assessment 1 - **Assignment 1:** CAD terminologies and Concepts in CAD Drafting

Assessment 2 - **Assignment 2:** Advance Concepts in CAD Drafting Exercises

Assessment 3 - **Test 1:** Concepts in CAD as an Application

Assessment 4 - **Project 1:** Application of 2D CAD Concepts

Assessment 5 - **Project 2:** Application of 2D CAD Concepts

Subject Textbook

1. Aouad, Ghassan (2012) Computer Aided Design Guide for Architecture, Engineering and Construction, Routledge Publication, United Kingdom.
2. Brightman, Michael (2018), The SketchUp Workflow for Architecture: Modelling Buildings, Visualizing Design, and Creating Construction Documents with SketchUp Pro and Layout,2 edition Wiley Publication, New Jersey, USA.
3. American Institute of Architects (2016), Architectural Graphic Standards (Ramsey/Sleeper Architectural Graphic Standards Series), 12th Edition, Wiley Publication, New Jersey, USA.

References

Selected CAD Software Manuals

CM126: CONSTRUCTION SURVEYING

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Surveying
Subject Code	CM126
Duration	13 Teaching weeks
Contact Hours	6 [2hrs lectures+2hrs tutorials+2hrs project]
Credit Points	15 [(2 x 4.2 + 2 x 2.1 + 2 x 1.4)]
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

Instruments, principles and operational methods for chain surveying, levelling surveying and theodolite surveying. Calculation of areas and volumes of earthworks from survey data.
Levelling surveys: linear levelling, longitudinal sections, cross sections. Theodolite surveys: angular measurements, distance measurements. Setting out building works: coordinates, grids horizontal and vertical dimensional control. Setting out civil works: works profiles, traverses, curves, roads, drains, excavations. Field exercise involving the application of the foregoing techniques.

Subject Topics

1. Levelling Surveys
2. Earthworks Calculations
3. Setting out Building works
4. Setting out civil works

Subject Outline

Topic	Content
1. Levelling Surveys	1.1 Linear levelling, longitudinal sections, cross sections.
2. Earthworks Calculations	2.1 Angular measurements, distance measurements
3. Setting out Building works	3.1 Coordinates, grids horizontal and vertical dimensional control
4. Setting out civil works	4.1 Works profiles, traverses, curves, roads, drains, excavations

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Surveys of small areas and simple buildings using chain, linear and techniques;
2. Surveys of small areas and simple buildings using theodolite surveying techniques;
3. Contouring of construction sites for computation of quantities for earthworks.
4. Survey complex sites using linear level;
5. Survey complex sites using theodolite;
6. Set out and level building and civil works.

Assessment Tasks and Weightings

There is no examination component for this subject. Continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% from the continuous assessment.

An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Test 1** **(20%)**
- **Project 1** **(30%)**
- **Test 2** **(20%)**
- **Project 2** **(30%)**

Assessment 1 - Test 1: Surveying levels
Assessment 2 - Project 1: Building set out
Assessment 3 - Test 2: Site Excavation
Assessment 4 - Project 2: Civil works set out

Subject Textbook

- Whyte W. and Paul R., Basic Metric Surveying, 4th Edition, Newness-Butterworth, Oxford.

References

- Muskett J., Site Surveying 2nd Edition, BSP Professional Books, Oxford.

CM128: CONSTRUCTION LAW

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Law
Subject Code	CM128
Duration	13 Teaching weeks
Contact Hours	4 [2hrs lectures+2hrs tutorial]
Credit Points	16 (4 x 4.2 + 0 x 2.1 + 0 x 1.4)
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

The origin of law in contemporary Papua New Guinea. The Papua New Guinea constitution and legal system. Legal bodies and authorities. The principles of law of contract. The essentials of a valid contract: offer and acceptance, intention, capacity, consideration, legality, possibility of performance, genuineness of consent, voidance, unenforceable and illegal contracts. Remedies for breach of contract. The nature of tort and general defences. Laws of contract and tort in relation to construction. Legal differences between various forms of business organization within the construction industry. Laws regulating employment. Introduction to insurance law, basic concepts underlying insurance law, procedures for effecting insurance, classes of insurance, fire insurance, insurance of construction work, accident insurance, employer's liability, public liability, professional liability insurance.

Subject Topics

1. Historical development of Legal system.
2. Legal system in PNG
3. Statutory control relating to Building Works
4. Law of Contracts and Torts in the building industry
5. Business forms and law on employment Insurance
6. Legal concepts within the building industry

Subject Outline

Topic	Content
1. Historical development of Legal system.	1.1 What is Law? 1.2 Legal Pluralism
2. Legal system in PNG	2.1 Courts and types of law in PNG, 2.2 State Law and Custom
3. Statutory control relating to Building Works	3.1 Rules and processes 3.2 Role of Building Boards

4. Law of Contracts and Torts in the building industry	4.1 What is a contract? 4.2 Contract Defaulting
5. Business forms and law on employment Insurance	5.1 Legal entity, 5.2 Business to be sued, 5.3 Labor Law, 5.4 Arbitration
6. Legal concepts within the building industry	6.1 Building Act Chapter 301

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Describe the historical development of the legal system and the place of precedence, statute, and local custom and practice in legal processes.
2. Explain the legal system operating in PNG and the structure of the judicial system.
3. Understand the basic statutory controls relating to building works in PNG.
4. Explain the general principles of the law with regard to contracts and tort as applied to construction.
5. Explain the general principles of the law with regard to various forms of business organisation, employment and insurance.
6. Understand how the above legal concepts are applied in day-to-day operations within the building industry.

Assessment Tasks and Weightings

The assessment for this subject has two main parts: (i) continuous assessment worth 60%, and (ii) examination component worth 40%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%.
An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20%)**
- **Test 1 (20%)**
- **Assignment 2 (20%)**
- **Examination (40%)**

Assessment 1 - Assignment 1: History of Law

Assessment 2 - Test 1: Courts in PNG

Assessment 3 - Assignment 2: Contract Law

Assessment 4 - Examination: Legal process in Building Industry

Subject Textbook

- Padfield C.F. and Barker D.L.A, Law made Simple, 12th Ed Butterworth-Heinemann, Oxford.
- Wilkie M. Practical Building Law, Batsford, London

References

- Vermeesch R. B. and Lindgren K. E, Business Law of Australia, 4th Edition Butterworth, Sydney.
- Selected readings related to subject topics.

CM124: CONSTRUCTION ECONOMICS I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Economics I
Subject Code	CM124
Duration	13 Teaching weeks
Contact Hours	7 [3 hrs lecture +2 hrs tutorial + 2 hrs practical]
Credit Points	19 [(4.2 x 3) + (1.2 x 2) + (1.4 x 2)]
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

The nature of economics and the economic environment in which the building industry operates. To introduce basic concepts about various types of business organisations and their establishment and management.

Subject Topics

1. Economic Environment
2. International Trade
3. Business Forms and Basic Accounting

Subject Outline

Topic	Content
1. Economic Environment	1.1 Introduction to general economics, opportunity cost, supply and demand, marginal analysis, market intervention 1.2 Price floors and price ceilings and their effects 1.3 Examples of the foregoing concepts as applied to the building industry 1.4 The national income account, gross national product 1.5 Unemployment and inflation: statistical price indices 1.6 Money and the banking system, the central bank and commercial banks, monetary policy and the national economy 1.7 Budget deficits, interest rates and inflation, monetary and fiscal measures: government control methods; 1.8 Productivity and growth in national wealth

2. International Trade	2.1 International economics, international trade, exchange rates, balance of payments; 2.2 Payment for imports, letters of credit, telegraphic transfers, bills of exchange; 2.3 Forward cover, import duties, taxes of the foregoing concepts as applied to the building industry; 2.4 Imported equipment, duties, exchange rates, risks, contracts with foreign firms.
3. Business Forms and Basic Accounting	3.1 Forms of business organization, establishing and running a business, directors' responsibilities 3.2 Financial structure of practices and related businesses, financial management: assets and liabilities, working and fixed capital, sources of capital, useful financial ratios, profit, taxation, depreciation, dividends, general reserve 3.3 Market planning; 3.4 Introduction to basic accounting and financial statements: profit and loss statements, analysis and interpretation of balance sheets, annual business returns, general office and project overheads, trading mark-ups, charge-out rates, basic office systems 3.5 Financial planning and control in projects, causes and prevention of financial instability and business failure

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Construct a basic economic model;
2. Explain the concept of planning for the efficient allocation of resources;
3. Describe how economic modelling can predict the present and future pattern of economic growth, inflation and unemployment;
4. Expound on the principles and procedures of international trade.
5. Select forms of businesses to suit various circumstances;
6. Prepare basic financial statements for small and medium-size practice and other related businesses;
7. Comment on the solvency and profitability of practices and related businesses.

Assessment Tasks and Weightings

The assessment for this subject has two main parts: (i) continuous assessment worth 70%, and (ii) examination component worth 30%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%.
An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (25%)**
- **Test 1 (25%)**
- **Assignment 2 (20%)**
- **Examination (30%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the basic structure of the economic model and how the construction industry is affected. The assignment is assessed by an assessment rubric and contributes 25% towards the final grade for the subject

Assessment 2 - **Test 1**: A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the principles of economics and how building price is determined. The test is assessed by the number of questions and their weighted marks and contributes 25% towards the final grade for the subject.

Assessment 3 - **Assessment 3 - Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The current economic climate and the demand for building products are investigated. The seminar is assessed by an assessment rubric and contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks and contributes 30% towards the final grade for the subject.

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Subject Textbook

- Calvert, R. E., (2012) Introduction to building management, Taylor & Francis, Hoboken, USA.
- Harris, F., McCaffer, M. (2013) Modern construction management, Wiley-Blackwell, Hoboken.
- Harcourt, S. V., (1988) Commerce and development in Papua New Guinea, Longman Cheshire, Melbourne.

References

- Tashjian, P., (1989) Business organisations in Papua New Guinea, Law Book Company, North Ride, Australia.
- Upson, A., (1987) Financial management for contractors, Blackwell Scientific Publications Professional Books, London, UK.
- Cairncross, Alexander K. Sinclair, Peter, (1982) Introduction to economics, Butterworth, Boston, USA

CM121: CONSTRUCTION TECHNOLOGY I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Technology I
Subject Code	CM121
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x 2.1) + (6 x 1.4)]
Delivery Mode	On campus
Prerequisites	CM 110
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

A range of studio projects designed to develop the student's basic understanding of architecture and building, from theoretical concepts to practical application. Evaluation of the design and specification of existing and new domestic-scale domestic buildings. Surveying and drawing up existing building structures and construction of models. Comprehend the type, size and use of building materials in domestic-scale buildings. Site visits to selected materials manufacturers/suppliers, to observe and report on the range and properties of construction materials currently on the market. Understanding how various building materials are manufactured and the procurement process.

Subject Topics

1. Understanding of Architecture and Construction Process in domestic scale building project
2. Design and Specification of existing and new domestic scale buildings
3. Surveying and Drawing up existing building structures
4. Materials manufacturing and supply

Subject Outline

Topic	Content
1. Understanding of Architecture and Construction Process in domestic scale building project	1.1 Basic design process 1.2 Basic construction process 1.3 Construction Documents
2. Design and Specification of existing and new domestic scale buildings	2.1 Evaluation of existing and new domestic scale buildings 2.2 Durability of materials in domestic scale building
3. Surveying and Drawing up existing building structures	3.1 Measuring up existing residential buildings for construction work. 3.2 Preparing drawings for existing residential building for construction work
4. Materials manufacturing and supply	4.1 Types of building materials and how they are manufactured. 4.2 Packaging materials for supply to construction work

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Appreciate the various building systems associated with domestic construction;
2. Apply the fundamental drawings skills developed, by preparing construction drawings, from information gathered from surveys of completed buildings;
3. Understand the compatibility of the materials and components used in the construction process;
4. Prepare scale models from construction drawings.
5. Building components used in the construction process;
6. Prepare scale models from construction drawings.

Assessment Tasks and Weightings
There is no examination component for this subject. Continuous assessment worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100% from the continuous assessment.

An assessment guide is given below.
Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20%)**
- **Documentation (30%)**
- **Site Visit Report (20%)**
- **Project (30%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the design and construction process in a residential scale building project. A written submission and seminar presentation is prepared for assessment.

Assessment 2 - **Documentation**: A set of working drawings and specifications is prepared for maintenance work on an existing residential building.

Assessment 3 - **Site Visit Report :** A report on site visit is prepared to discuss the manufacturing process and packaging of materials used in a residential scale building.

Assessment 4 - **Final Project:** A model of a residential scale building built to scale.

Subject Textbook

- Chudley R (2013), Building Construction Handbook 10th edition, Newnes, Oxford.
- PNG Department of Works: Architectural Technical Specification, reprint.
- Chapter 301: Building Act, PNG Government Printer.
- PNG Structural Manual for Domestic Buildings.

References

- Chapter 301: Building Act, PNG Government Printer.

CM210: QUANTITY SURVEYING AND ESTIMATING I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Quantity Surveying and Estimating 1
Subject Code	CM 210
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x 2.1) + (6 x 1.4)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	

Synopsis

This subject provides an introductory lecture for students in the discipline of quantity surveying and estimating. It introduces the students to the basic principles of measuring and estimating building works, to demonstrate the ability to defining and explaining the main process of preparing bills of quantities, to apply the standard method of measurement for building works for uniformity, to draft billing descriptions of items of building works in accordance with the standard method of measurement of building works, to apply simple quantity surveying skills in taking off of quantities, abstracting and creating a bill of quantities for a small timber and masonry building plan.

Subject Topics

1. Introduction to quantity surveying and estimating
2. The bills of quantities (BOQs)
3. The types of formats for preparing bills of quantities (BOQs)
4. The processes for preparing bills of quantities
5. The principles of measurements of quantities
6. The standard method of measurement (SMM) of building works
7. The drafting of billing description for an item of building works

Subject Outline

Topic	Content
1. Introduction to quantity surveying and estimating	1.1 What is quantity surveying and estimating? 1.2 What is a quantity surveyor? 1.3 The roles and responsibilities of a quantity surveyor. 1.4 The main areas of employment in quantity surveying.
2. The bills of quantities (BOQs)	2.1 What are bills of quantities? 2.2 The content of the bills of quantities 2.3 The main purposes of the bills of quantities

3. The types of formats for preparing bills of quantities (BOQs)	3.1 Types of bills of quantities formats 3.2 The work section order bills (trade order bills) 3.3 The elemental bills 3.4 The sectionalized trade bills 3.5 The operational bills 3.6 The activity bills 3.7 The annotated bills (specified bills of quantities)
4. The processes for preparing bills of quantities	4.1 The process of taking off of quantities on a take-off sheet 4.2 The process of working up of quantities on a take-off sheet 4.3 The process of squaring of quantities on a take-off sheet 4.4 The process of abstracting of quantities on an abstract sheet 4.5 The process of billing of quantities on a billing sheet
5. The principles of measurements of quantities	5.1 The taking off dimensions and the use of take-off paper 5.2 The measurement of dimensions and presentation on paper 5.3 The use of time-sing and dotting on 5.4 The use of bracketing and side casts 5.5 The use of referencing (signposting) and ampersand 5.6 How to alter dimensions and the use of deductions in take off
6. The standard method of measurement (SMM) of building works	6.1 What is a standard method of measurement? 6.2 The use of standard methods of measurement. 6.3 The sections of the standard method of measurement of measurement in building works 6.4 The general rules and recommendations in the standard method of measurement in building works.
7. The drafting of billing description for an item of building works	7.1 The use of abbreviations in formulating bill of quantity descriptions 7.2 The process involved in writing billing descriptions for an item of work 7.3 The use of the standard method of measurement of building works to formulating billing descriptions
8. Introduction to quantity surveying and estimating	8.1 What is quantity surveying and estimating? 8.2 What is a quantity surveyor? 8.3 The roles and responsibilities of a quantity surveyor. 8.4 The main areas of employment in quantity surveying.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Apply the main processes of preparing bills of quantities
2. Apply the standard method of measurement of building works
3. Draft descriptions of items of building work in accordance with the SMM
4. Apply the principles of taking off quantities of works
5. Apply principles of abstracting
6. Create a full bill of quantity for a project

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises 60% continuous and 40% final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Assignment 2 (15%)**
- **Test (30%)**
- **Examination (40%)**

Assessment 1 - **Assignment 1:** This is an individual student assessment which requires the student to describe the types of bills of quantity formats and to present in excel format. This assignment is assessed by an assessment rubric and contributes 15% towards the final grade for the subject.

Assessment 2 - **Assignment 2**: This is an individual student assessment which requires the student to take off the quantity of building materials from a simple architectural drawing plan. The assignment is assessed by an assessment rubric and contributes 15% towards the final grade for the subject.

Assessment 3 - **Test:** This is an individual student assessment which requires students to draft a billing description of building works with reference to the standard method of measurement (SMM).

	The test is assessed by an assessment rubric and contributes 30% towards the final grade for the subject.
Assessment 4 -	**Final Examination:** This is an individual student assessment which requires students to take off, abstract and create a bill of quantity for a simple timber and concrete block work building. The examination is assessed by an assessment rubric and contributes 40% towards the final grade for the subject.

Subject Textbook

- Australian Standard Method of Measurement of Building Works (5th Edition), Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia (1991)
- Marsden, P.K. (1998) Basic Building Measurement, UNSW Press, Kensington, Australia
- Bond, G., Civil engineering drafting, UNITECH Printery, Lae

References

- Chudley, R, (2013) Building Construction Handbook, Routledge, Oxford, UK
- Tutt, P., Adler, D., (1990) New Metric Handbook, Architectural Press, London, UK
- Everett, A., Barritt, C. M. H., (2013) Materials (Mitchell's Building Series) 5th Edition, Routledge, New York, USA

CM212: CONSTRUCTION MANAGEMENT I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Management I
Subject Code	CM212
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lectures+2hrs tutorials+6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x 2.1 + (6 x 1.4)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

To provide an understanding of the principles of resource allocation and coordination in construction.

Subject Topics

1. Statutory requirements for building works in PNG
2. Preparation of construction strategies, planning and programming using basic planning techniques
3. Basic layout and organisation of the construction sites
4. Delivery and storage of materials; Consideration of wastage during the construction process

Subject Outline

Topic	Content
1. Statutory requirements for building works in PNG	1.1 Introduction to Chapter 301 1.2 Roles of Building Board and Building Inspector
2. Preparation of construction strategies, planning and programming using basic planning techniques	2.1 Introduction to construction planning 2.2 The Bar chart
3. Basic layout and organization of the construction sites	3.1 Construction Site Planning 3.2 Site Facilities 3.4 Site Access

4.	Delivery and storage of materials; Consideration of wastage during the construction process	4.1 Materials Schedule 4.2 Materials Storage 4.3 Waste Management

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Layout and organise a site for simple construction projects;
2. Prepare construction programs for simple projects;
3. Analyse and determine labour requirement for construction work
4. Analyse and determine plant and equipment requirements for construction work
5. Analyse and determine materials requirements for various construction operations.
6. Mitigating waste in construction work

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises two (2) assignments, one (1) test and a final examination in this subject.
An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Examination (40%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the significance of Construction Planning for Building Projects. Discuss history of construction planning and its benefits for building projects. The assignment is assessed by an assessment rubric.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of planning for construction work. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. A project construction site is provided to do the site layout plan and the construction schedule. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Examination:** This Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

CM214: STRUCTURES

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Structures
Subject Code	CM214
Duration	13 Teaching weeks
Contact Hours	10 [2 hrs + 2 hrs tutorial + 6hrs project]
Credit Points	21 [(4.2 x 2) + (2.2 x 2) + (1.4 x 6)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce the theory and design features of building structures and the basic structural mechanics in building systems. The adaptation of a quantitative approach to structural mechanics and the discussion of the behavioural outcome that fosters and the understanding of the part that structures play as an active influence in architectural design. The understanding of forces and displacements and moments and shears is quantitative terms. The use of structural elements of timber, steel and reinforced concrete. To grasp the understanding of building structural performance under the stress and pressures of external and internal compressive, tensile, loads, stresses and lateral forces. The choice of structural systems likely to be most suitable, checking structural stability under both vertical and horizontal loads by means of 'load-paths', estimation of loads acting on selected structural members, estimation of maximum bending moments and shear force in beams and estimation of structural member sizes.

Subject Topics

1. Forces, Moments and Equilibrium
2. Ties and Struts
3. Loading on Buildings and Graphical Statics
4. Pin-jointed Structures
5. Bracing Buildings
6. Properties of Areas

7. Bending and Shear Stresses
8. Design of Beams

Subject Outline

Topic	Content
1 Forces, Moments and Equilibrium	1.1 Forces on Structure 1.2 Measure of Forces 1.3 External Forces 1.4 Resultants and Components 1.5 Moments 1.6 Couples 1.7 Equilibrium 1.8 Co-planner Forces 1.9 Concurrent Force Systems 1.10 Forces and supports 1.11 Stability and Determinacy 1.12 Parallel Force Systems 1.13 Internal Forces and Deformation
2 Ties and Struts	2.1 Pressure 2.2 Stress 2.3 Types of Stress 2.4 Strain and Elasticity 2.5 Permissible Stress 2.6 Ties and Struts
3 Loading on Buildings and Graphical Statics	3.1 Loading Codes 3.2 Dead Loads 3.3 Live Loads 3.4 Wind Loads 3.5 Computation of Loads acting on building structure 3.6 Graphical Statics
4 Pin-jointed Structures	4.1 Pin-jointed Frames 4.2 The Maxwell Diagram 4.3 Method of Joints 4.4 Method of Sections 4.5 Pitch Trusses
5 Bracing Buildings	5.1 Triangulation 5.2 Rigid Frames 5.3 Three-Dimensional Structure
6 Loading on Buildings and Graphical Statics	6.1 Loading Codes 6.2 Dead Loads 6.3 Live Loads 6.4 Wind Loads 6.5 Computation of Loads acting on building structure 6.6 Graphical Statics

7 Pin-jointed Structures	7.1 Pin-jointed Frames 7.2 The Maxwell Diagram 7.3 Method of Joints 7.4 Method of Sections 7.5 Pitch Trusses

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Expound on basic structural theory as related to the design of building structures, and structural members;
2. Expound on basic structural theory as related to the design of structural timber, structural steel elements and reinforced concrete.
3. Understand elements of lateral stability for structural frames and determine design loads for buildings.
4. Understand the constituents and properties of structural timber, structural steel and reinforced concrete.
5. Determine the axial forces in plane pin-connected trusses and frames; the internal forces in statically determinate beams and properties of areas.
6. Use relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes;
7. Understand Calculate bending and shear stresses and deflection of structural elements
8. The design of beams – Timber Beams

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, and 40% for the Final Project must be achieved. An assessment guide is given below.

Students must also refer to the Subject Assessment Details.

- **Assignment 1** **(20%)**
- **Assignment 2** **(20%)**
- **Test 1** **(20%)**
- **Project** **(40%)**

Assessment 1 - **Assignment 1:** Group-based research on all the building structure types, the structural theories applicable to the building types, the structural materials applied. The assessment contributes 20% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** An individual task to show evidence of building structure understanding of lateral stability for structural frames and design loading for buildings, the constituents and properties of structural timber, structural steel and reinforced concrete in an architecture design project. The Progress Report contributes 20% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building structural systems in determining the axial forces in plane pin-connected trusses and frames; the internal forces in statically determinate beams and properties of areas; and the use relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes;

Assessment 4 - **Final Assessment Project:** An individual task to calculate bending and shear stresses and deflection of structural elements and the use relevant structural tables to evaluate the forces acting on typical reinforced concrete and structural steel elements and calculate sizes. The presentation contributes 40% towards the final grade for the subject.

Subject Textbook

- K.J. Wyatt, (1979) Principles of Structure, UNSW School of Architecture, Sydney.
  Departmental Modules

References

- Hough, Richard (1982) Structures Design Package 2nd Edition, School of Architecture, UNSW, Sydney Australia.
- Whitfield David (1983) Papua New Guinea Structural manual for Domestic Buildings, PNG Department of Works, Port Moresby.

AR213: BUILDING SYSTEMS I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Building Systems I
Subject Code	AR213
Duration	13 Teaching weeks
Contact Hours	10 [2 hrs + 2 hrs tutorial + 6hrs project]
Credit Points	21 [(4.2 x 2) + (2.2 x 2) + (1.4 x 6)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

This subject provides students with the knowledge base of common building materials and properties and use in construction; for low-rise small to medium scale residential buildings and small to medium scale commercial and institutional buildings. The substructure elements of: excavation, foundations, and ground floor construction. The superstructure elements of: external walls, internal partitions, joinery items including doors, windows, wardrobes, cupboards, main frames in steel, concrete and timber, cladding systems, fire requirements, glazed areas, common stairways. Roofs: types of roof construction, covering material, water collection and storm water drainage. Finishing trades: various trade works, specialist contractors, security applications, proprietary partitioning. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing. integration of services into the building fabric, special requirements for industrial waste. External works: hard landscaping, delivery and storage requirements, parking, lighting and security systems.

Subject Topics

1. Building Substructure
2. Building Superstructure
3. External and internal cladding
4. Roofing Structures and Systems
5. Building Material and Compositions
6. Building Services and Service Installations

Subject Outline

Topic	Content
1. Building Substructure	1.1 Common building materials: 1.2 properties and use in construction. 1.3 Substructure: excavation, foundations, 1.4 ground floor construction.
2. Building Superstructure	2.1 Superstructure: Vertical and Horizontal superstructure 2.2 External and Internal Load-Bearing walls, 2.3 internal partitions, 2.4 joinery items including doors, windows, wardrobes, cupboards, staircases.
3. External and internal cladding	3.1 External Cladding 3.2 Weather Proofing
4. Roofing Structures and Systems	4.1 Roofs: types of roof construction, covering material, storm water drainage.
5. Building Material and Compositions	5.1 Timber 5.2 Steel 5.3 Concrete 5.4 Glass
6. Building Services and Service Installations	6.1 Finishing trades: plastering, fair faced blockwork, proprietary boards, painting and tiling. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Possess the knowledge of building material types, their properties and their application in building works.
2. Describe the various domestic-scale construction systems;
3. Prepare construction drawings showing how the materials are placed and fixed into position;
4. Explain the function of written technical specifications and write sample clauses;
5. Define the terminology relating to various building services;
6. Identify the type, range and functions of the various external and internal building elements;
7. Make appropriate choices and recommendations for the various supply and distribution systems based on economics and efficiency

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall, and at least 40% for the Final Written Examination must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (10%)**
- **Assignment 2 (10%)**
- **Test 1 (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Group-based research on all the building, substructure, superstructure, material types, their properties, application and where the material and, prevalent in their usage and, in the types of buildings. The assessment contributes 10% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** An individual task to show evidence of project documentation (construction drawings and technical specification required) of an architecture design project. The Progress Report contributes 10% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building systems comprehension of material science, service installations, and buildability application. This assessment contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Examination**

Subject Textbook

- Chudley R.; and Greeno, R. (2005) Building Construction Handbook, 5th Ed. Elsevier Butterworth Heinemann, Singapore.
- PNG Department of Works: Architectural Technical Specification., reprint. Chapter 301: Building Act, PNG Government Printer.

References

- Reid E., Understanding Buildings, Longman Scientific and Technical, UK.
- Burbery P., Environment & Services, Mitchell's Building Series, Longman, Essex.

CM220: QUANTITY SURVEYING AND ESTIMATING 2

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Quantity Surveying and Estimating 2
Subject Code	CM220
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lecturers + 2hrs tutorials + 6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x2.1) + (6 x1.4)]
Delivery Mode	On campus
Prerequisites	**CM 210**
Co-requisites	
Subject Coordinator	TBA

Synopsis

This subject introduces the students in the discipline of quantity surveying and estimating in preparing bills of quantities and the calculations of unit rates for a building work. It introduces the students to apply the principles of preparing bills of quantities, apply quantity surveying skills in taking off of quantities, creating an abstract and creating a bill of quantities for a building plan, apply estimating skills in predicting the cost of construction by calculating the all-in cost of labour, plant and materials for a small to medium sized masonry, reinforced concrete and timber-based buildings.

Subject Topics

1. Introduction to quantity surveying process
2. Bills of quantities (BOQs)
3. The all-in cost of materials, labour and plant
4. The quantity surveying process
5. The standard method of measurement (SMM)
6. Writing bills of quantities descriptions
7. The compiling of the bills of quantities (BOQs)
8. The unit rate analysis of items of work

Subject Outline

Topic	Content
1. Introduction to quantity surveying process	1.1 Taking off 1.2 Abstracting 1.3 Billing
2 Bills of quantities (BOQs)	2.1 The purpose for the bills of quantities 2.2 Types of bills of quantities formats 2.3 The standard for bills of quantities to be applied 2.4 Preparing bills of quantities for a project 2.5 Purpose of approximate bills of quantities
3 The all-in cost of materials, labour and plant	3.1 Calculate the all-in cost of materials 3.2 Calculate the all-in cost of labour 3.3 Calculate the all-in cost of plants 3.4 Types of wastages in materials 3.5 Labor constants (man-hours)
4 The quantity surveying process	4.1 Taking off 4.2 Abstracting 4.3 Billing 4.4 Timesing, Dimensioning and Squaring 4.5 Descriptions and side casting
5 The standard method of measurement (SMM)	5.1 The measurement rules 5.2 The billing units and terminology 5.3 The tabulated rules
6 Writing bills of quantities descriptions	6.1 Formulate bills of quantities descriptions 6.2 The use of the SMM general rules in writing descriptions 6.3 The arrangement of the bills of quantities in trades of work

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7	The compiling of the bills of quantities (BOQs)	7.1 Creating bills of quantities format 7.2 The bills of quantities item of order 7.3 The bills of quantities with quantities, unit rates and cost
8	The unit rate analysis of items of work	8.1 Materials unit rates 8.2 Labor unit rates 8.3 Plants unit rates

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to;

1. Apply the main processes of preparing bills of quantities
2. Apply the work up, squaring of building works
3. Prepare a bill of quantities for building works
4. Calculate the all-in cost of labour, plant and materials
5. Apply the principles of taking off of building works
6. Carry out abstracting and creating a bill of quantity

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises of two (2) assignments, one (1) test and a final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Assignment 2 (15%)**
- **Test 1 (30%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** This is an individual student assessment which requires the student to describe the main processes of preparing bills of quantities and to do a presentation. This assignment is assessed by an assessment rubric and contributes 15% towards the final grade for the subject.

Assessment 2 - **Assignment 2:** This is an individual student assessment which requires the student to take off, abstract and create the bill of quantities from a simple building plan. The assignment is assessed by an assessment rubric and contributes 15% towards the final grade for the subject.

Assessment 3 - **Test 1:** This is an individual student assessment which requires the student to calculate the all-in cost of labour, plant and materials and describe the process in SMM. The test is assessed by an assessment rubric and contributes 30% towards the final grade for the subject.

Assessment 4 - **Final Examination:** This is an individual student assessment which requires the students to take off, abstract and create a bill of quantity and finally compile the unit rates for a medium size building plan. The examination is assessed by an assessment rubric and contributes 40% towards the final grade for the subject**.**

Subject Textbook

- Australian Standard Method of Measurement of Building Works (5th Edition), Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia (1991)
- Marsden, P.K. (1998) Basic Building Measurement, UNSW Press, Kensington, Australia
- Bond, G., Civil engineering drafting, UNITECH Printery, Lae

References

- Chudley, R, (2013) Building Construction Handbook, Routledge, Oxford, UK
- Tutt, P., Adler, D., (1990) New Metric Handbook, Architectural Press, London, UK
- Everett, A., Barritt, C. M. H., (2013) Materials (Mitchell's Building Series) 5th Edition, Routledge, New York, USA

CM222: CONSTRUCTION MANAGEMENT II

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Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Management II
Subject Code	CM222
Duration	13 Teaching weeks
Contact Hours	10 [2hrs lecturers + 2hrs tutorials + 6hrs project]
Credit Points	21 [(2 x 4.2) + (2 x 2.1) + (6 x 1.4)]
Delivery Mode	On campus
Prerequisites	**CM 212**
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce management theory, the concepts of motivation, and the importance of efficient and effective communications within the context of management.

Subject Topics

1. Introduction to management theory, understanding and applying motivation theory to the construction process.
2. A review of the industrial relations policies relevant to construction
3. Forms of communication, the importance of clear communication in management practice, procedures for formal meetings, providing correct documentation.

Subject Outline

Topic	Content
1. Introduction to management theory, understanding and applying motivation theory to the construction process.	1.1 Understanding of Management Theory and its application in a construction firm. 1.2 Understanding various Motivation Theories and Theory and its application to improve productivity in a construction setting
2. A review of the industrial relations policies relevant to construction	2.1 Understanding of industrial relation and its effect on workers employment conditions and how to address employment issues
3. Forms of communication, the importance of clear communication in management practice, procedures for formal meetings, providing correct documentation.	3.1 Understanding method of communication tom enhance work process in a construction Project

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to;

1. Apply the main processes of preparing bills of quantities
2. Apply the standard method of measurement of building works
3. Draft descriptions of items of building work in accordance with the SMM
4. Apply the principles of taking off quantities of works
5. Apply principles of abstracting
6. Create a full bill of quantity for a project

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises two (2) assignments, one (1) test and a final examination in this subject.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (25%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (30%)**

Assessment 1 -	**Assignment 1:** Carry out literature review on the history of management theories and its evolution to the latest contemporary approaches in managing projects. The assignment is assessed by an assessment rubric.
Assessment 2 -	**Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the management and motivation theories and their applications to project. The test is assessed by the number of questions and their weighted marks.
Assessment 3 -	**Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. Mega project case studies are given to discuss their industrial relation issues. The seminar is assessed by an assessment rubric.
Assessment 4 -	**Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

CM221: CONSTRUCTION TECHNOLOGY II

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Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Technology II
Subject Code	CM 221
Duration	13 Teaching weeks
Contact Hours	4 [2 hrs lectures] + [4 hrs tutorials]
Credit Points	16 [(2 x 4.2) + (4 x 2.1)]
Delivery Mode	On campus
Prerequisites	**CM 121**
Co-requisites	
Subject Coordinator	TBA

Synopsis

To develop an understanding of building systems and processes used in the construction of domestic, commercial and light industrial buildings.

Subject Topics

1. Building Systems
2. Construction Method
3. Design & Documentation
4. Building Materials
5. Construction Tools & Equipment

Subject Outline

Topic	Content
1. Building Systems	1.1 Residential/ commercial/ industrial 1.2 Timber/ steel/ block/ concrete construction details
2. Construction Method	2.1 Timber construction 2.2 Steel construction 2.3 Block/ concrete construction 2.4 standard technical specification
3. Design & Documentation	1.1 Design of existing building 1.2 Scale modelling from the design
4. Building Materials	4.1 Properties of building materials 4.2 Material scheduling
5. Construction Tools & Equipment	5.1 Plants and equipment and their use in the construction process

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to;

1. Appreciate the various building systems associated with domestic, commercial and industrial buildings.
2. Understand the compatibility of materials and components used in the construction process.
3. Apply the fundamental drawings skills developed, by preparing construction drawing, from information gathered from survey buildings and prepare scale models to suit.
4. Consider the appropriate use of materials and quality of finish achieved.
5. Prepare a schedule of materials from given drawings.
6. Understand the range of basic plants and equipment used during the construction process.

Assessment Tasks and Weightings

To pass this subject, you must achieve an overall mark of 50% and you must submit all compulsory assessments.

Students must also refer to the Subject Assessment Details.

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- **Assignment 1** **(20%)**
- **Project 1** **(40%)**
- **Assignment 2** **(25%)**
- **Project 2** **(15%)**

Assessment 1 - **Assignment 1:** An Individual/ Group Task: An individual/ group base assignment using a compiled documented design drawing to identify the building components and the construction process. The assignment is assessed by an assessment rubric.

Assessment 2 - **Group Project:** A group visit to both a residential, commercial or industrial building and document the existing layout and prepare a scale model from the plan. The project is assessed by an assessment rubric.

Assessment 3 - **Assignment 2:** An individual material scheduling assignment on a documented drawing. The assignment is assessed by an assessment rubric.

Assessment 4 - **Project 2:** An Individual Task: A individual research project encompassing the knowledge of the various tools, plants and equipment utilised during the building construction process. The assignment is assessed by an assessment rubric.

Subject Textbook

- Riley Mike, Cotgrave Alison (Construction Technology 2: Industrial and Commercial Building), 3rd Edition, 2014

References

- Armpriest Diane, Mehta.L.Madan, Scarboroght Walter (Building Construction: Principles, Materials and Systems) 3rd Edition, 2017

AR 223: BUILDING SYSTEMS II

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Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Building Systems II
Subject Code	AR 223
Duration	13 Teaching weeks
Contact Hours	10 [2 hrs + 2 hrs tutorial + 6hrs project]
Credit Points	21 [(4.2 x 2) + (2.1 x 2) + (1.4 x 6)]
Delivery Mode	On campus
Prerequisites	**AR 213**
Co-requisites	
Subject Coordinator	TBA

Synopsis

This subject provides the knowledge base of common and new building materials, technologies, properties and use in construction; for medium to high-rise commercial, institutional and civic buildings. The substructure elements of: excavation, foundations, and ground floor construction. The superstructure elements of: external walls, internal partitions, joinery items including doors, windows, wardrobes, cupboards, main frames in steel, concrete and timber, cladding systems, fire requirements, glazed areas, common stairways. Roofs: types of roof construction, covering material, water collection and storm water drainage. Finishing trades: various trade works, specialist contractors, security applications, proprietary partitioning. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing. integration of services into the building fabric, special requirements for industrial waste. External works: hard landscaping, delivery and storage requirements, parking, lighting and security systems.

Subject Topics

1. High-rise Building Substructure
2. High-rise Building Superstructure
3. Modern external and internal cladding technology
4. Roofing Structures and Systems
5. Building Material Technology and Compositions
6. Building Services and Service Installations

Subject Outline

Topic	Content
1. High-rise Building Substructure	1.1 Materials and technology applications on common and modern building construction requirements: 1.2 Substructure: excavation, foundations, 1.3 Ground and successive floor construction considerations.
2. High-rise Building Superstructure	2.1 Superstructure: Vertical and Horizontal superstructure 2.2 External and Internal Load-bearing walls, 2.3 internal partitions, 2.4 joinery items including doors, windows, wardrobes, cupboards, staircases.
3. Modern external and internal cladding technology	3.1 External Cladding 3.2 Weather Proofing
4. Roofing Structures and Systems	4.1 Roofs: types of roof construction, covering material, storm water drainage.
5. Building Material Technology and Compositions	5.1 Timber 5.2 Steel 5.3 Concrete 5.4 Glass
6. Building Services and Service Installations	6.1 Finishing trades: plastering, fair faced blockwork, proprietary boards, painting and tiling. Services: water, electricity, gas, telephone, surface water drainage. External works: landscaping, drives, footpaths, fencing.

Subject Learning Outcomes (SLOs)
On completion of this subject, the students will possess the skills and knowledge to:

1. Possess the knowledge of building material types, their properties and their application in selected building works.
2. Describe the various medium to high-rise commercial, institutional and civic-scale construction systems;
3. Prepare construction drawings showing how the materials are placed and fixed into position;
4. Explain the function of written technical specifications and write sample clauses;
5. Define the terminology relating to various building services in selected building types;
6. Identify the type, range and functions of the various external and internal building elements in the selected building types;
7. Make appropriate choices and recommendations for the various supply and distribution systems based on economics and efficiency.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject at least 60% overall, and at least 40% for the Final Written Examination must be achieved.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (10%)**
- **Assignment 2 (10%)**
- **Test (20%)**
- **Project (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Group-based research on high-rise building, substructure, superstructure, material types, their properties, application and where the material and, prevalent in their usage and, in the types of buildings.

Assessment 2 - **Assignment 2:** An individual task to show evidence of project documentation (construction drawings and technical specification required) of a high-rise architecture design project. The Progress Report contributes 10% towards the final grade for the subject.

Assessment 3 - **Test 1:** The articulation of building systems comprehension of material science, service installations, and buildability application. This assessment contributes 20% towards the final grade for the subject.

Assessment 4 - **Project 2:** An Individual Task: An individual research project encompassing the knowledge of the various tools, plants and equipment utilised during the building construction process. The assignment is assessed by an assessment rubric.

Assessment 5 - **Final Examination**

Subject Textbook

- Watson, D.; (2004) Time Saver Standards for Architectural Design: Technical Data for Professional Practice, 8th Ed. Mc Graw-Hill Education
- Chudley R.; and Greeno, R. (2005) Building Construction Handbook, 5th Ed. Elsevier Butterworth Heinemann, Singapore.
- PNG Department of Works: Architectural Technical Specification., reprint. Chapter 301: Building Act, PNG Government Printer.

References

- Reid E., Understanding Buildings, Longman Scientific and Technical, UK.
- Burbery P., Environment & Services, Mitchell's Building Series, Longman, Essex.

CM310: QUANTITIES AND ESTIMATING III

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Quantities and Estimating III
Subject Code	CM310
Duration	13 Teaching weeks
Contact Hours	10 [2hrs Lecturers + 6hrs Tutorials + 2hrs Project]
Credit Points	21 [(2hrs x 4.2) +(2hrs x 2.1) +(6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	**CM220**
Co-requisites	
Subject Coordinator	TBA

Synopsis

This subject introduces the students in the discipline of quantity surveying and estimating in the principles of measuring quantities, calculating quantities and preparing bills of quantities for different work sections of a complete small to medium sized timber, masonry or steel structured buildings. To apply the principles of taking off and abstracting from architectural drawings, calculating unit rates for items of building works and preparation of schedules of materials for building projects. To create a complete bill of quantities (BOQ) with descriptions, unit rates and total cost carried forward to collection or summary.

Subject Topics

1. Introduction to preliminaries, overheads and profit margins in construction projects
2. Ground works
3. Concrete works
4. Masonry works
5. Stone works
6. Structural Steel works
7. Metal works
8. Wood works

Subject Outline

Topic	Content
1. Introduction to preliminaries, overheads and profit margins in construction projects	1.1 What are preliminaries? 1.2 Preliminaries in tender documents 1.3 How to price preliminaries? 1.4 Factors affecting preliminaries 1.5 How do preliminaries affect overall cost? 1.6 Overheads and profit margins
2. Ground works	2.1 Taking off 2.2 Abstracting 2.3 Unit rate calculations 2.4 Preparing bills of quantities
3. Concrete works	3.1 Taking off 3.2 Abstracting 3.3 Unit rate calculations 3.4 Preparing bills of quantities
4. Masonry works	4.1 Taking off 4.2 Abstracting 4.3 Unit rate calculations 4.4 Preparing bills of quantities
5. Stone works	5.1 Taking off 5.2 Abstracting 5.3 Unit rate calculations 5.4 Preparing bills of quantities
6. Structural Steel works	6.1 Taking off 6.2 Abstracting 6.3 Unit rate calculations

	6.4 Preparing bills of quantities
7. Metal works	7.1 Taking off 7.2 Abstracting 7.3 Unit rate calculations 7.4 Preparing bills of quantities
8. Wood works	8.1 Taking off 8.2 Abstracting 8.3 Unit rate calculations 8.4 Preparing bills of quantities

Subject Learning Outcomes (SLOs)

To consolidate knowledge of the principles of taking off, abstracting and to introduce methods of calculating unit rates for building work. On completion of this subject, the students will possess the skills and knowledge to:

1. Apply the take-off processes
2. Apply the abstracting processes
3. Prepare draft bills for a complete project
4. Build up the unit rates for building works
5. Prepare schedule of materials
6. Compile a complete bill of quantities (BOQ)

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20%)**
- **Assignment 2 (20%)**
- **Test 1 (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** This is an individual assessment which requires students to do take off, abstracting, calculating unit rates and preparing bills of quantities for preliminaries, groundworks and concrete works for a small to medium size building.

Assessment 2 - **Project 1:** This is a group project assessment which requires small clusters/groups of students to do take off, abstracting, calculating unit rates and preparing bills of quantities for masonry works, structural steel and metal works, for a small to medium size building.

Test 1 - **Test 1:** This is an individual assessment which requires students to do take off, abstracting, calculating unit rates and preparing bills of quantities for woodworks, glazing, hardware, roofing works, windows and doors, for a small to medium size building.

Final Examination- **Final Examination:** This is an individual assessment which requires students to do take off, abstracting, calculating unit rates and preparing bills of quantities for finishes and painting, furniture, hydraulics, drainage and electrical works for a small to medium size building. A final presentation of the overall project will be presented for assessment.

Subject Textbook

- Australian Standard Method of Measurement of Building Works (5th Edition), Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia (1991)
- Marsden, P.K. (1998) Basic Building Measurement, UNSW Press, Kensington, Australia
- Bond, G., Civil engineering drafting, UNITECH Printery, Lae
- Buchan, R.D., Fleming, F. W., Grant, Fiona E. K., Estimating for builders and surveyors, Butterworth-Heinemann, Oxford, UK, 2003.

References

- Chudley, R, (2013) Building Construction Handbook, Routledge, Oxford, UK
- Tutt, P., Adler, D., (1990) New Metric Handbook, Architectural Press, London, UK

- Everett, A., Barritt, C. M. H., (2013) Materials (Mitchell's Building Series) 5th Edition, Routledge, New York, USA

CM311: CONSTRUCTION TECHNOLOGY III

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Technology III
Subject Code	CM311
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	**CM221**
Co-requisites	
Subject Coordinator	TBA

Synopsis
To develop a practical understanding of building services and their integration within the construction process.

Subject Topics
1. Working Drawings
2. Material Production
3. Services in Existing Buildings
4. Materials Handling

Subject Outline

Topic	Content
1. Working Drawings	1.1 Studio projects designed to provide the practical application of building services.
2. Material Production	2.1 Industrial visits to materials suppliers and specialist contractors.
3. Services in Existing Buildings	3.1 Practical assessments of building services installed in existing structures.
4. Materials Handling	4.1 Consideration of the storage, security and movement of materials, components and equipment involved in building services, during the construction process.

Subject Learning Outcomes (SLOs)
On completion of this subject, the students will possess the skills and knowledge to:
1. Identify the range of services expected to be incorporated into modern buildings and understand the basic terminology.
2. Define the basic terminology of building services
3. Describe the materials and components used for building services;
4. Appreciate the spatial requirements of building services within a structure;
5. Comprehend the installation of building services in buildings;
6. Interpret construction and coordination requirements from building services drawings.

Assessment Tasks and Weightings
This is a continuous assessment (CA) for this subject worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises four (4) major projects as shown below.

Students must also refer to the Subject Assessment Details.

- **Project 1 (20%)**
- **Report (20%)**
- **Seminar (20%)**
- **Project 2 (40%)**

Assessment 1 - **Project 1:** Prepare working drawings incorporating services.

Assessment 2 - **Report:** Prepare a report on a visit to a material manufacturing plant.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. Report on incorporation of services in existing buildings. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Project:** Prepare a complete set of service drawings of a residential building.

Subject Textbook

- Chudley R (2013), Building Construction Handbook 10th edition, Newnes, Oxford.
- PNG Department of Works: Architectural Technical Specification, reprint.
- Chapter 301: Building Act, PNG Government Printer.
- PNG Structural Manual for Domestic Buildings.

References

- Chapter 301: Building Act, PNG Government Printer.

CM312: CONSTRUCTION MANAGEMENT III

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Management III
Subject Code	CM312
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM222 Construction Management II
Co-requisites	
Subject Coordinator	TBA

Synopsis

To develop further knowledge of management as applied to building projects. These include application of advance planning and scheduling techniques. Site mobilisation and management of resources on site such as plants are to be conducted effectively. The cash flow is to be managed effectively including the engagement of subcontractors.

Subject Topics

1. Advance Planning and Scheduling
2. Mobilisation
3. Plant Management
4. Sub-Contracting
5. Cash-flow Management
6. Site Costs

Subject Outline

Topic	Content
1. Advance Planning and Scheduling	1.1 Project planning and scheduling using more advanced planning techniques;
2. Mobilization	2.1 Mobilizing onto a job;
3. Plant Management	3.1 Purchasing, hiring plants, maintenance and depreciation.
4. Sub-Contracting	4.1 Engagement of subcontractors
5. Cash-flow Management	5.1 Contractor's cash flow forecasting: defining, approving, monitoring and recording of reimbursable site costs;
6. Site Costs	6.1 Monitoring and controlling site costs;
7. Advance Planning and Scheduling	7.1 Project planning and scheduling using more advanced planning techniques;

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Mobilise on to site in preparation for construction work
2. Prepare overall and short-term management programs using more advanced planning techniques;

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3. Explain how to procure and coordinate the resources needed for efficient site management;
4. Prepare cash flow forecasts and monitor and control site costs of building projects;
5. Develop procedures for the efficient and effective utilisation of plant and equipment.
6. Engage subcontractors in projects;

Assessment Tasks and Weightings
Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Carry out literature review on various advance planning techniques. Discuss their uses in Building Projects. The assignment is assessed by an assessment rubric.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the Network Planning Technique. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The seminar will discuss Plant and Cash Flow Management on construction work. The seminar is assessed by an assessment rubric

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Fellows, Richard F., Langford, David, Newcombe, Robert, Urry, Sydney, Construction management in practice, John Wiley & Sons, Hoboken, USA, 2009.

References

- Calvert, R. E., Introduction to building management, Taylor & Francis, Hoboken, USA, 2012.Readings and Resources:

CM314: CONSTRUCTION ECONOMICS II

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Economics II
Subject Code	CM314
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM 124 Construction Economics I
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce basic concepts about various types of business organisations and their establishment and management.

Subject Topics

1. Setting up a business
2. Financial Management
3. Assets and Liabilities
4. Marketing
5. Basic Accounting
6. Finance in Construction

Subject Outline

Topic	Content
1. Setting up a business	1.1 Forms of business organization, establishing and running a business, directors' responsibilities;
2. Financial Management	2.1 Financial structure of construction and related businesses, financial management:
3. Assets and Liabilities	3.1 Assets and liabilities, working and fixed capital, sources of capital, useful financial ratios, profit, taxation, depreciation, dividends, general reserve;
4. Marketing	4.1 Market planning;
5. Basic Accounting	5.1 Introduction to basic accounting and financial statements: profit and loss statements, analysis and interpretation of balance sheets, annual business returns, general office and project overheads, trading mark-ups, charge-out rates, basic office systems;
6. Finance in Construction	6.1 Financial planning and control in construction, causes and prevention of financial instability and business failure.
7. Setting up a business	7.1 Forms of business organization, establishing and running a business, directors' responsibilities;

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Select forms of businesses to suit various circumstances;
2. Prepare basic financial statements for small and medium-size construction and other related businesses;
3. Comment on the solvency and profitability of construction and related businesses.
4. Apply marketing concepts in construction business
5. Apply basic accounting practices in construction business
6. Arrange capital for construction business

Assessment Tasks and Weightings

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Conduct Literature Review and discuss the history and role of business.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of Financial Management as applied in construction. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The objective is to discuss a construction business. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Calvert, R. E., Introduction to building management, Taylor & Francis, Hoboken, USA, 2012.
- Harris, F., McCaffer, M.,Modern construction management, Wiley-Blackwell, Hoboken, 2013.References:

References

- Tashjian, P., Business organisations in Papua New Guinea, Law Book Company, North Ride, Australia, 1989.
- Upson, A., Financial management for contractors, Blackwell Scientific Publications Professional Books, London, UK, 1987.

CM320: QUANTITIES AND ESTIMATING IV

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Quantities and Estimating IV
Subject Code	CM320
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM310 Quantities and Estimating III
Co-requisites	
Subject Coordinator	TBA

Synopsis

This subject introduces the students in the discipline of quantity surveying and estimating in the principles of taking-off of quantities, abstracting and build-up of unit rates of buildings constructed of reinforced concrete, steel framing, masonry and timber; including the pricing of preliminaries and site overheads; preparation of tenders and documents, calculation of off-site overheads and profit margins, allowance for firm prices; writing of bills of quantities descriptions; producing estimates and bills of quantities by computer applications (spreadsheet approach); analysing and finalising the tenders and quotations

Subject Topics

1. Glazing and Hardware
2. Roofing works
3. Doors and Windows
4. Finishes and Painting
5. Furniture
6. Hydraulics and Drainage
7. Electrical and Mechanical works
8. Exterior Elements (Landscaping)
9. Preparing a Tender Document

Subject Outline

Topic	Content

1. Glazing and Hardware	1.1 Take off and abstract 1.2 Unit rate analysis 1.3 Compile of bills of quantities
2. Roofing works	2.1 Take off and abstract 2.2 Unit rate analysis 2.3 Compile of bills of quantities
3. Doors and Windows	3.1 Take off and abstract 3.2 Unit rate analysis 3.3 Compile of bills of quantities
4. Finishes and Painting	4.1 Take off and abstract 4.2 Unit rate analysis 4.3 Compile of bills of quantities
5. Furniture	5.1 Take off and abstract 5.2 Unit rate analysis 5.3 Compile of bills of quantities
6. Hydraulics and Drainage	6.1 Take off and abstract 6.2 Unit rate analysis 6.3 Compile of bills of quantities
7. Electrical and Mechanical works	7.1 Take off and abstract 7.2 Unit rate analysis 7.3 Compile of bills of quantities
8. Exterior Elements (Landscaping)	8.1 Take off and abstract 8.2 Unit rate analysis 8.3 Compile of bills of quantities
9. Preparing a Tender Document	9.1 The tender process 9.2 Parts of tender documents 9.3 Analyzing tender documents and quotations 9.4 Tender schedules (plants/equipment and suppliers)

Subject Learning Outcomes (SLOs)

To consolidate knowledge of measuring, estimating and tendering for building works, the procedures involved in preparing bills of quantities for a complete medium to high rise building project and analysing tenders. On completing the subject, the student should be able to:

1. Apply the processes of take-off and abstracting of quantities
2. Prepare bill of quantities for a complete medium to high rise building project
3. Build-up unit rates for all sections and trades involved in a building
4. Prepare estimates and tender package for complete building project
5. Analyse tenders and quotations from suppliers
6. Prepare spreadsheet approach (computer applications in estimating)

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%.

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (20%)**
- **Assignment 2 (20%)**
- **Test 1 (20%)**
- **Final Examination (40%)**

Assessment 1 -	**Assignment 1:** This is an individual assessment which students do to take off, abstracting, calculating unit rates and preparing bills of quantities for ground works, concrete works, masonry works, stone works, structural steel and metal works for a medium to high rise building.
Assessment 2 -	**Project 1:** This is a group project assessment which requires small clusters/groups of students to do take off, abstracting, calculating unit rates and preparing bills of quantities for woodworks, doors, windows, glazing and hardware for a medium to high rise building.
Assessment 3 -	**Test 1:** This is an individual assessment which students do take off, abstracting, calculating unit rates and preparing bills of quantities for roofing works, electrical works, hydraulics and drainage for a medium to high rise building. This project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject.
Assessment 4 -	**Final Examination:** This is an individual assessment which students take off, abstracting, calculating unit rates and preparing bills of quantities for furniture, finishes and painting works for a medium to high rise building. Finally calculating preliminaries, overheads and profits and preparing a tender document for the overall project for assessment. This project is assessed by an assessment rubric and contributes 25% towards the final grade for the subject.

Subject Textbook

- Australian Standard Method of Measurement of Building Works (5th Edition), Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia (1991)
- Marsden, P.K. (1998) Basic Building Measurement, UNSW Press, Kensington, Australia
- Bond, G., Civil engineering drafting, UNITECH Printery, Lae
- Buchan, R.D., Fleming, F. W., Grant, Fiona E. K., Estimating for builders and surveyors, Butterworth-Heinemann, Oxford, UK, 2003.
- Cooke, A. E., Construction tendering: theory and practice, Batsford, London, UK, 1991.

References

- Chudley, R, (2013) Building Construction Handbook, Routledge, Oxford, UK
- Tutt, P., Adler, D., (1990) New Metric Handbook, Architectural Press, London, UK
- Everett, A., Barritt, C. M. H., (2013) Materials (Mitchell's Building Series) 5th Edition, Routledge, New York, USA
- Kwakye, A. A., Understanding tendering and estimating, Gower Publishing, Aldershot, UK, 1994.

CM322: CONSTRUCTION MANAGEMENT IV

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Management IV
Subject Code	CM322
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1 + (6hrs x 1.4))]
Delivery Mode	On campus
Prerequisites	CM312 Construction Management III
Co-requisites	
Subject Coordinator	TBA

Synopsis

To provide an insight into the management techniques used to improve productivity in construction. The dynamic of labour in construction is understood. Construction output is managed by doing work studies. The negotiation process is embraced to obtain better deals for productivity. Marketing of construction services is covered.

Subject Topics

1. Construction Productivity
2. Labour Analysis for Construction Work
3. Negotiation
4. Quality Management
5. Safety
6. Maintenance of Buildings

Subject Outline

Topic	Content
1. Construction Productivity	1.1 Introduction to work study, method study, work measurement and the application in construction management;

2. Labor Analysis for Construction Work	2.1 Development of human resources and labor analysis for construction firms;
3. Negotiation	3.1 Negotiating techniques;
4. Quality Management	4.1 Implementation of quality assurance procedures;
5. Safety	5.1 Managing safety;
6. Maintenance of Buildings	6.1 Maintenance management.

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Describe the characteristics, organisation and control of labour in the construction industry;
2. Apply the principles of work study to construction operations;
3. Employ the principles and procedures of negotiation;
4. Prepare a plan for marketing construction services.
5. Apply quality management in projects.
6. Apply safety management in projects.

Assessment Tasks and Weightings

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the significance of Construction Output for Building Projects. Select a hypothetical project to demonstrate how work study is done. The assignment is assessed by an assessment rubric.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the significance of labour in a large building project. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The seminar will cover discuss quality management in a large building project the seminar is assessed by an assessment rubric

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

CM324: CONSTRUCTION ECONOMICS III

Course(s) Bachelor of Construction Management (NQF Level 8)
Subject Name Construction Economics III
Subject Code CM324
Duration 13 Teaching weeks
Contact Hours 10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points 21 [(2hrs x 4.2) + (2hrs x 2.1 + (6hrs x 1.4))]
Delivery Mode On campus
Prerequisites CM314 Construction Economics II
Co-requisites
Subject Coordinator TBA

Synopsis
To provide an understanding of the principles used in assessing the economic viability of investments in the construction industry.

Subject Topics
1. Time Value of Money
2. Project Costs
3. Life Cycle Costs
4. Investment Appraisal Techniques
5. Approximate Estimating Techniques
6. Building Development
7. Valuation

Subject Outline

Topic	Content
1. Time Value of Money	1.1 Time value of money, compound interest formulae and tables;

2. Project Costs	2.1 Project costs: initial costs, running costs, operating and maintenance costs;
3. Life Cycle Costs	3.1 Introduction to life-cycle costing;
4. Investment Appraisal Techniques	4.1 Investment appraisal techniques: payback, average return, net present value, internal rate of return, break-even analysis, cost-benefit analysis;
5. Approximate Estimating Techniques	5.1 Approximate estimating techniques and building costs indices: their compilation and uses;
6. Building Development	6.1 Economics of building development and the concept of a developer's budget;
7. Valuation	7.1 Introduction to valuation processes and determinants of land values.

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Explain the effect of time on value of money in investment decisions
2. Identify the components of project cost
3. Explain the methods used to establish estimates of the initial costs of proposed construction projects;
4. Calculate the costs of proposed projects in terms of initial, annual and periodic costs;
5. Apply various appraisal techniques in making investment decisions.
6. Carry out valuation of investment properties

Assessment Tasks and Weightings

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Do TVM calculations on a big building project proposal.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of Investment Appraisal Techniques. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The objective is to apply the various approximate estimating techniques on a big project. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Seeley, I. H., Building economics, Macmillan, Basingstoke, UK, 1996.

References

- Kirkham, Richard, Ferry and Brandon's cost planning of buildings, Wiley-Blackwell, Chichester, UK, 2015.

CM328: CONTRACT ADMINISTRATION

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Contract Administration
Subject Code	CM 328
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1 + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce the principles and practice of administering building construction contracts with an emphasis on the financial calculations and adjustments to be made to the contract sum in accordance with the conditions of contract.

Subject Topics

1. Variations
2. Prime Cost and Provisional Sums
3. Valuation
4. Retentions
5. Site Delays
6. Financial Reports

Subject Outline

Topic	Content
1. Contract Sum	1.1 The make-up of the contract sum;

2. Variations	2.1 Variation orders, measurement and valuation of variations, the variations account, day works account, measurement and adjustment of provisional quantities.
3. Prime Cost and Provisional Sums	3.1 Adjustment of prime cost and provisional sums; Rise and fall (fluctuations):
4. Valuation	4.1 The traditional method of valuing and the use of indices; Valuation for interim certificates, certificates and payments,
5. Retentions	5.1 Retentions and the pattern of release, retention security;
6. Site Delays	6.1 Progress and site meetings, delays and extension of time, assessing the cost of delays, contractual claims,
7. Financial Reports	7.1 Financial statements and financial reports; Completion, defects and the preparation of statements of the final account.

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Assess the effects of variation orders on Contract Sum
2. Assess the effects of nominated works and supplies on Contract Sum
3. Assess the effects of rise and fall, and extension of time on the Contract Sum;
4. Prepare interim valuations for progress payments;
5. Prepare simple financial statements and reports forecasting the probable final cost of the project;
6. Set out a statement of the final account.

Assessment Tasks and Weightings

Students must also refer to the Subject Assessment Details.

- **Assignment 1 (15%)**
- **Test 1 (25%)**
- **Seminar (20%)**
- **Final Examination (40%)**

Assessment 1 - **Assignment 1:** Carry out literature review on the significance of Construction Planning for Building Projects. Discuss history of construction planning and its benefits for building projects. The assignment is assessed by an assessment rubric.

Assessment 2 - **Test 1:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of planning for construction work. The test is assessed by the number of questions and their weighted marks.

Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. A project construction site is provided to do the site layout plan and the construction schedule. The seminar is assessed by an assessment rubric.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examination is assessed by the numbers of questions and their weighted marks.

Subject Textbook

- Contract administration for the building team, Blackwell Science Publishing, London, UK, 1996.
- Australian Standard: AS 2124.
- General conditions of contract with AS 2125 and AS 2127.

References

- Contract administration for the building team, Blackwell Science Publishing, London, UK, 1996.
- Australian Standard: AS 2124.

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- General conditions of contract with AS 2125 and AS 2127.

CM410: PROJECT DYNAMICS I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Project Dynamics I
Subject Code	CM410
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1 + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM320 Quantities and Estimating IV, CM322 Construction Management IV, CM324 Construction Economics III, CM328 Contracts Administration
Co-requisites	
Subject Coordinator	TBA

Synopsis
Stage 1 consolidates all knowledge learnt in the early stages of the course and applies in the construction of a major complex capstone project. From site mobilisation to construction of superstructure.

Subject Topics
1. Planning for Constricted Site
2. Construction of Foundation / Basement;
3. Construction of Superstructure;
4. Elemental Cost Plan
5. Managing Labour Resource
6. Cost and Finance

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Subject Outline

Topic	Content
1. Planning for Constricted Site	1.1 Site Hoardings/Public Safety 1.2 Site Access 1.3 Location of Tower Crane 1.4 Location of Amenities
2. Construction of Foundation / Basement	2.1 Site excavation/demolition 2.2 Sheet pile system / Tiebacks 2.3 Pile installation/Caps 2.4 Value and Quality Management for the works covered
3. Construction of Superstructure	3.1 Ground floor slab/columns/beams 3.2 First Floor slab/columns/beams 3.3 Use of slip forms/Concrete pumps etc. 3.4 Value and Quality Management for the works covered
4. Elemental Cost Plan	4.1 What is an Element? 4.2 Listing works covered in Elemental Cost Plan 4.3 Pricing Elemental Cost Plan for works covered
5. Managing Labour Resource	5.1 Identification and recruitment of labour required for works covered 5.2 Directing labour to works 5.3 Controlling labour at work
6. Cost and Finance	6.1 Set out cost budget for works covered 6.2 Arranging finance for works covered 6.3 Controlling costs of work covered against budget

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to;

1. Plan, prepare and mobilise on to a constricted project site;
2. Manage construction of basement and foundation system;
3. Manage construction of building superstructure.
4. Develop elemental cost plan for all works in Stage 1.
5. Plan and Organise labour resources in all works in Stage 1.
6. Plan and Organise costs and finance in works covered in Stage 1.

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises one major project divided into gate submissions. The mode of delivery will be by sizable groups to foster team building and integration. There are 4 gate submissions as set out below;

There are 4 gate submissions as set out below;

Assessable Tasks		Assessment Descriptions	Weightings
1	Gate A	Site Mobilisation on a constricted site	25%
2	Gate B	Pile Foundation	25%
3	Gate C	Basement Construction	25%
4	Gate D	Superstructure Construction	25%

Total:	100%

Subject Textbook

- Australian standard method of measurement of building works, Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia, 2012.
- **Marsden**, P.K., Basic building measurement, UNSW Press, Kensington, Australia, 1998.
- **Buchan**, R.D., **Fleming**, F. W., **Grant**, Fiona E. K., Estimating for builders and surveyors, Butterworth-Heinemann, Oxford, UK, 2003.
- Contract administration for the building team, Blackwell Science Publishing, London, UK, 1996.
- **Cooke**, B., Contract planning case studies, Macmillan Education, Basingstoke, UK, 1988.
- **Calvert**, R. E., Introduction to building management, Taylor & Francis, Hoboken, USA, 2012.
- **Fellows**, Richard F., **Langford**, David, **Newcombe**, Robert, **Urry**, Sydney, Construction management in practice, John Wiley & Sons, Hoboken, USA, 2009.

References

- **Seeley**, I. H., Seeley and Winfield's building quantities explained, Palgrave Macmillan, Basingstoke, UK, 2009.
- **Kwakye**, A. A., Understanding tendering and estimating, Gower Publishing, Aldershot, UK, 1994.

CM412: PROJECT MANAGEMENT

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Project Management
Subject Code	CM412
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1 + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM320 Quantities and Estimating IV, CM322 Construction Management IV, CM324 Construction Economics III, CM328 Contracts Administration
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce the basic principles of managing projects on behalf of a client. The role of Project Manager is covered as an agent for the client in managing the project from inception to completion and post completion.

Subject Topics

1. Project Manager
2. Projects for Project Management;
3. Managing design and construction of projects;
4. Soft skills
5. Financial Management

6. Computers

Subject Outline

Topic	Content
1. Project Manager	1.1 Serving the client (employer) 1.2 Procurement system 1.3 A team leader
2. Projects for Project Management;	2.1 Mega Project 2.2 Staged Project
3. Managing design and construction of projects;	3.1 Client's Needs and Requirements 3.2 Value Management 3.3 Bridging Design and Construction
4. Soft skills	4.1 Project Culture 4.2 Labor as asset and not cost
5. Financial Management	5.1 Project Finance 5.2 Procuring Finance 5.3 Managing Finance

Subject Learning Outcomes (SLOs)
On completion of this subject, the students will possess the skills and knowledge to:

1. Explain the role of the project manager in the construction process;
2. Identify the types of projects for which project management may be required;
3. Describe the basic techniques used to manage design and construction of projects;
4. Apply soft skills in team management
5. Financial Management
6. Use computers as a key project management tool.

Assessment Tasks and Weightings
The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises one major project divided into gate submissions. The mode of delivery will be by sizable groups to foster team building and integration.

There are 4 gate submissions as set out below;

Assessable Tasks		Assessment Descriptions	Weightings
1	Gate A	Project Management Structure and Roles in the capstone project	25%
2	Gate B	Identify the Nature of the Capstone Project and its Risks in the Design and Construction stages.	25%
3	Gate C	Define the project culture of the capstone project	25%
4	Gate D	Managing the Finance and ICT in the capstone project	25%
Total:			100%

Subject Textbook

- Contract administration for the building team, Blackwell Science Publishing, London, UK, 1996.
- Cooke, B., Contract planning case studies, Macmillan Education, Basingstoke, UK, 1988.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

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CM414: CONSTRUCTION ECONOMICS IV

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Economics IV
Subject Code	CM414
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM324 Construction Economics III
Co-requisites	
Subject Coordinator	TBA

Synopsis

The subject identifies the design, locational and economic factors affecting the construction costs of buildings.

Subject Topics

1. Design decisions and project cost;
2. Plan Shape;
3. Functional Requirement;
4. Structural System
5. Elemental Cost Analysis;
6. Cost planning techniques.

Subject Outline

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Topic	Content
1. Design decisions and project cost;	1.1 Cooperation between parties 1.2 Maintaining the Client's Objective
2. Plan Shape;	2.1 Cost implications of various plan shapes
3. Functional Requirement;	3.1 Cost implications of various functional requirements
4. Structural System	4.1 Cost implications of various structural systems
5. Elemental Cost Analysis;	5.1 Elemental Cost Planning using the NPWC Format

Learning Outcomes (SLOs)

To identify the design, locational and economic factors affecting the construction costs of buildings. On completing the student should be able to:

1. Determine the extent to which various design decisions change the cost of construction;
2. Dealing with Plan Shape to keep costs within limits;
3. Dealing with Functional Requirement to keep cost within limits;
4. Dealing with Structural Systems to keep costs within limits.
5. Analyse building costs by elements;
6. Apply cost planning techniques in preliminary estimating of project costs.

Assessment Tasks and Weightings

- **Seminar (15%)**
- **Test 1 (25%)**
- **Test 2 (20%)**
- **Final Examination (40%)**

Assessable Tasks		Assessment Descriptions	Weightings
1	Seminar	Identify the design requirements and effect of various plan shapes and functional requirements on costs in the capstone project.	15%
2	Test 1	Apply design requirements, shape, functional requirements and structural systems cost analysis on the capstone project	25%
3	Test 2	Apply cost planning techniques using elemental and comparative methods	20%
4	Final examination	Apply design requirements, plan shape, functional requirements, structural systems, elemental and comparative cost planning techniques on capstone project	40%
Total:			100%

Subject Textbook

- Seeley, I. H., Building economics, Macmillan, Basingstoke, UK, 1996.

References

- Calvert R. E., Introduction to Building Management, 6th Edition, Butterworth Heinemann, Boston.
- Forster G., Construction /site Studies Production, Administration and Personnel. Longman, 2nd edition. Essex.

CM419: BUILT ENVIRONMENT RESEARCH I

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Built Environment Research I
Subject Code	CM419
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	
Co-requisites	
Subject Coordinator	TBA

Synopsis

Stage 1 is to provide training for independent research in construction management. Research methods and skill are taught to equip the student to be able to conduct basic research in a construction project.

Subject Topics

1. Role of research
2. Research Outline and proposed Topic
3. Research Question & Hypothesis
4. Research Methods
5. Data Analysis
6. Research proposal.

Subject Outline

Topic	Content

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…….

1. Role of research	1.1 What is research? 1.2 Research in construction work
2. Research Outline and proposed Topic	2.1 Prepare research outline 2.2 Identify research topic
3. Research Question & Hypothesis	3.1 Identify Research Question(s) and Hypothesis
4. Research Methods	4.1 Identify research methodology
5. Data Analysis	5.1 Identify data analysis tools

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Explain the role of research in academic and professional life;
2. Design Research Outline and Research Topic
3. Identify Research Methods.
4. Identify Data Analytical Tools.
5. Set up research plan, and
6. Prepare research proposal

Assessment Tasks and Weightings

The assessment for this subject is worth 100% and is an individual effort. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises work on the capstone project divided into gate submissions. There are 4 gate submissions as set out below;

Assessable Tasks		Assessment Descriptions	Weightings
1	Gate A	Prepare Research Outline and Topic.	25%
2	Gate B	Identify Research Methods	25%
3	Gate C	Prepare Research Questions and Hypothesis	25%
4	Gate D	Prepare Research Proposal for submission	25%
Total:			100%

Subject Textbook

- Babbie, E. R., The practice of social research, Cengage Learning, New York, USA, 2015.

References

- Moser, C.A., Kalton, G., Survey methods in social investigation, Ashwood Publishing, Aldershot, 2001.
- Flynn, R.R., An introduction to information science, Marcel Dekker, New York, 1988.

CM420: PROJECT DYNAMICS II

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Project Dynamics II
Subject Code	CM420
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM410 Project Dynamics I
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

Stage 2 of the subject consolidates all knowledge learnt in the early stages of the course and applies in the construction of a major complex capstone project. Cover all other works continuing from Stage 1 to complete the project.

Subject Topics

1. External cladding and Façade.
2. Internal Linings, and Services.
3. Lift, and Suspended Ceiling.
4. Fire Fighting Systems and Roof.
5. Fire Fighting Systems and Roof.
6. Costs and finance
7. Quality and safety

Subject Outline

Topic	Content
1. External cladding and Façade.	1.1 Types of external and façade system 1.2 Installation of the systems
2. Internal Linings, and Services.	2.1 Types of internal linings and services and their installation
3. Lift, and Suspended Ceiling.	3.1 Types of Lift and Suspended Ceiling and their installations
4. Fire Fighting Systems and Roof.	4.1 Types of Fire Fighting and Roof Systems and their installation
5. Costs and finance	5.1 Identify the cost and financial need for the capstone project
6. Quality and safety	6.1 Managing Quality and Safety in the Capstone Project

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Manage construction of External cladding and Façade.
2. Manage construction of Internal Linings, and Services.
3. Manage construction of Lift, and Suspended Ceiling.
4. Manage Construction of Fire Fighting Systems and Roof.
5. Plan and Organise costs and finance in works covered in Stage 1.
6. Mange quality and safety

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises work on the capstone project divided into gate submissions. The mode of delivery will be by sizable groups to foster team building and integration. There are 4 gate submissions as set out below;
There are 4 gate submissions as set out below;

Assessable Tasks		Assessment Descriptions	Weightings
1	Gate A	External cladding/Façade, Internal Linings and Services	25%
2	Gate B	Installation of Lift and Suspended Ceiling	25%
3	Gate C	Installation of Fire Fighting and Roof Systems	25%
4	Gate D	Cost, Finance and Quality and Safety in Capstone Project	25%
Total:			100%

Subject Textbook

- Australian standard method of measurement of building works, Australian Institute of Quantity Surveyors and Master Builders Australia, Deakin, Australia, 2012.
- Marsden, P.K., Basic building measurement, UNSW Press, Kensington, Australia, 1998.
- Buchan, R.D., Fleming, F. W., Grant, Fiona E. K., Estimating for builders and surveyors, Butterworth-Heinemann, Oxford, UK, 2003.
- Contract administration for the building team, Blackwell Science Publishing, London, UK, 1996.
- Cooke, B., Contract planning case studies, Macmillan Education, Basingstoke, UK, 1988.
- Calvert, R. E., Introduction to building management, Taylor & Francis, Hoboken, USA, 2012.

References

- Seeley, I. H., Seeley and Winfield's building quantities explained, Palgrave Macmillan, Basingstoke, UK, 2009.
- Kwakye, A. A., Understanding tendering and estimating, Gower Publishing, Aldershot, UK, 1994.
- Fellows, Richard F., Langford, David, Newcombe, Robert, Urry, Sydney, Construction management in practice, John Wiley & Sons, Hoboken, USA, 2009.

CM421: FACILITIES MANAGEMENT

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Facilities Management
Subject Code	CM421
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM314 Construction Economics III, CM 412 Project Management
Co-requisites	
Subject Coordinator	TBA

Synopsis

The subject will develop knowledge to manage facilities. This will involve managing multidisciplinary integrated system, managing different types of facilities, understanding various lease arrangements, maintenance schedule and property valuation, life cycle costs, depreciation of assets and asset registry of facilities.

Subject Topics

1. Mega projects.
2. Computer Planning and Scheduling,
3. Organisation structure of complex projects, Projects in constricted sites,
4. Projects in constricted sites,
5. Managing time driven projects,
6. Managing change

Subject Outline

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Topic	Content
1. What is Facilities Management?	1.1 What is Facilities Management? 1.2 Facilities Management and the Core Function of an organization
2. Multi-disciplinary,	1.1 All integrated system
3. Types of facilities to manage,	1.1 Property Developer 1.2 Institutional 1.3 Campus
4. Various leasing arrangement, Maintenance system, Valuation,	4.1 Types of leases and Strata Title 4.2 Maintenance Systems 4.3 Valuation of Properties
5. Life cycle costs and depreciation of assets,	5.1 What is Life Cycle Cost? 5.2 Asset Disposal Cost
6. Asset register of facilities	6.1 What is an Asset Register?

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Understand the different facilities to manage,
2. Know the various systems of leasing properties,
3. Manage a maintenance system
4. Prepare a valuation of a property
5. Prepare life cycle costs and depreciation of assets
6. Develop an asset register of facilities

Assessment Tasks and Weightings

The assessment for this subject is worth 100% continuous. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The 4 assessment tasks for the subject are divided as follow;

- **Assignment** **(15%)**
- **Test** **(20%)**
- **Seminar** **(25%)**
- **Project** **(40%)**

Assessment 1 **Assignment:** Carry out search on the latest computer software available for planning and schedule of complex projects. The assignment is assessed by an assessment rubric.

Assessment 2 **Test:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the various leasing and maintenance systems for large corporations and institutions. The test is assessed by the number of questions and their weighted marks.

Assessment 3 **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. Life Cycle Costs in a large setting is studied and the various valuation systems available are investigated and the findings are presented in a seminar. The seminar is assessed by an assessment rubric.

Assessment 4 **Project:** The project is done in a sizable group to develop an Asset Register System for the Organization covered by the Seminar. The project is assessed by an assessment rubric.

Subject Textbook

- Brian Atkin, Adrian Brooks; Total Facility Management 4th Edition, Wiley-Blackwell; 4th Ed. (February 23, 2015)

References

- Kathy Roper, Richard Payant; The Facility Management Handbook; AMACOM; 4th Ed. (July 30, 2014)

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CM422: CONSTRUCTION MANAGEMENT V

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Construction Management V
Subject Code	CM 422
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM 322 Construction Management IV
Co-requisites	
Subject Coordinator	TBA

Synopsis

To introduce skills and techniques of managing complex projects in the competitive business environment. Emphasis is given on entrepreneurial approach and the objective of making profit.

Subject Topics

1. Mega projects.
2. Computer Planning and Scheduling,
3. Organisation structure of complex projects, Projects in constricted sites,
4. Projects in constricted sites,
5. Managing time driven projects,
6. Managing change

Subject Outline

Topic	Content
1. Mega projects.	1.1 Anatomy of a complex project

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2. Computer Planning and Scheduling,	2.1 Application of latest computer software in Planning and Scheduling.
3. Organization structure of complex projects, Projects in constricted sites,	3.1 Setting up an organization structure of a mega project
4. Projects in constricted sites,	4.1 Setting out projects in constricted sites in CBDs.
5. Managing time driven projects	5.1 Delivering projects in a tight schedule
6. Managing change	6.1 Delivering Change Orders within time, cost and quality

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Comprehend the level of complexity in big building projects
2. Prepare plans and schedule using computers
3. Set out organisation structure of complex projects
4. Plan projects in constricted sites
5. Deliver projects in tight schedules
6. Managing change

Assessment Tasks and Weightings

The assessment for this subject is worth 100% continuous. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The 4 assessment tasks for the subject are divided as follow;

- **Assignment (15%)**
- **Test (20%)**
- **Seminar (25%)**
- **Project (40%)**

Assessment 1 **Assignment:** Carry out search on the latest computer software available for planning and schedule of complex projects. The assignment is assessed by an assessment rubric.

Assessment 2 **Test:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students' understanding of the various leasing and maintenance systems for large corporations and institutions. The test is assessed by the number of questions and their weighted marks.

Assessment 3 **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. Life Cycle Costs in a large setting is studied and the various valuation systems available are investigated and the findings are presented in a seminar. The seminar is assessed by an assessment rubric

Assessment 4 **Project:** The project is done in a sizable group to develop an Asset Register System for the Organization covered by the Seminar. The project is assessed by an assessment rubric.

Subject Textbook

- Frank Harris, Ronald McCaffer; Modern Construction Management 7th Edition; Wiley-Blackwell

References

- Andrew Watts; Modern Construction Handbook 5th Edition; Birkhauser

CM 429: BUILT ENVIRONMENT RESEARCH II

Course(s)	Bachelor of Construction Management (NQF Level 8)
Subject Name	Built Environment Research II
Subject Code	CM 429
Duration	13 Teaching weeks
Contact Hours	10 [2 lectures+2 hours tutorials + 6 hours project]
Credit Points	21 [(2hrs x 4.2) + (2hrs x 2.1) + (6hrs x 1.4)]
Delivery Mode	On campus
Prerequisites	CM 419 Built Environment Research I
Co-requisites	
Subject Coordinator	TBA

Synopsis

Stage 2 takes students to pursue the proposal developed to collect data, analyse and write up the thesis.

Subject Topics

1. Data Collection,
2. Analytical tools,
3. Data Test, Data Analysis,
4. Recommend efficient systems,
5. Innovate new and alternate solutions,
6. Publishing research paper, Research report

Subject Outline

Topic	Content
1. Data Collection,	1.1 Carry out data collection

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2. Analytical tools,	2.1 Identify required analytical tools
3. Data Test, Data Analysis,	3.1 Analyze Data collected towards expected results
4. Recommend efficient systems,	4.1 Derive list of solutions to the unique problems of capstone project
5. Innovate new and alternate solutions	5.1 Confirm results and raise alternative options
6. Publishing research paper, Research report	6.1 Write up the thesis for defences.

Subject Learning Outcomes (SLOs)

On completion of this subject, the students will possess the skills and knowledge to:

1. Data Collection
2. Identify analytical tools to analyse data,
3. Test, analyse and recommend efficient systems
4. Innovate new and alternate solutions
5. Publish a research paper
6. Compile a research report

Assessment Tasks and Weightings

The assessment for this subject is worth 100%. To obtain a pass grade in this subject, a 50% overall must be scored from the total 100%. The assessment comprises one major project divided into gate submissions. The mode of delivery will be by sizable groups to foster team building and integration.

There are 4 gate submissions as set out below;

Assessable Tasks		Assessment Descriptions	Weightings
1	Gate A	Collect required data specified in the Research Proposal developed in Phase 1. Identify analytical Tools for data analysis.	25%
2	Gate B	Analyse Data	25%
3	Gate C	Derived results from data analysis and argue towards hypothesis and conclusion	25%
4	Gate D	Write up the thesis and defend.	25%
Total:			100%

Subject Textbook

- Babbie, E. R., The practice of social research, Cengage Learning, New York, USA, 2015.
- Moser, C.A., Kalton, G., Survey methods in social investigation, Ashwood Publishing, Aldershot, 2001.

References

- Flynn, R.R., An introduction to information science, Marcel Dekker, New York, 1988.

SCHOOL OF
SURVEYING & LAND STUDIES

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SCHOOL OF SURVEYING AND LAND STUDIES COURSE HANDBOOK

Head of School

- **Andrew Pai,** PhD (QUT, Australia), MSc (UQ, Australia), BTLM (PNGUoT)

Deputy Head of School

- **Lewi Kari,** MSST (USQ, Australia), BCAR (PNGUoT)

Academic Team

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Senior Lecturer

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- **Rosemary Adu,** PhD (QUT, Australia), MUrDev (QUT, Australia), GCert.BEE (QUT, Australia), BLS (PNGUoT)

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- **Jerry Mille,** PGDE (UOG), MPhil (PNGUoT), BLST(PNGUoT)
- **Jeffery Petrus,** EMBA (PNGUoT), Mphil (PNGUoT), BPVP (PNGUoT)
- **Lepani Karigawa,** MPhil (PNGUoT), BLST (PNGUoT)
- **James Seniela,** MPhil (PNGUoT), BPST (PNGUoT), PGCSCT (PNGUoT)
- **Paulus Motoro,** Mcs. UP&A (Int. Sch. Urban Science, Uni, Seoul, S/Korea), MPhil (PNGUoT), BPST (PNGUoT)

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Professors

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- **Sujoy Jana,** PhD (VU, India), MSc (VU, India), BSc (VU, India)

Senior Lecturer

- **Cathy Koloa**, PhD (PNGUoT), MPhil (PNGUoT), BGIS (PNGUoT) PGCSCT (PNGUoT)
- **Tingneyuc Sekac,** PhD (PNGUoT), MPhil (PNGUoT), BGIS (PNGUoT)

Lecturers

- **Lewi Kari,** MSST (USQ, Australia), BTech Cart. (PNGUoT)
- **Wycliffe Antonio**, MSc (UTas, Australia), GradDip (UTas, Australia), GradDip (PNGUoT), BTech Cart. (PNGUoT)
- **Glen Yali**, MPhil (PNGUoT), BGIS (PNGUoT)
- **Camilla Yanabis Kwaudi**, Mphil (PNGUoT), BTech Cart. (PNGUoT), PGCSCT (PNGUoT)

Surveying Section

Associate Professor

- **Richard Stanaway**, PhD (UNSW), MPhil (ANU), BAppSc(Surv) QUT, FASPNG, FIAG, MGCA(Aust), CPSurv(Aust), Registered Surveyor (PNG)

Lecturers

- **Navua Kapi**, MPhil (PNGUoT), PGS Cert (PNGUoT), BSVY (PNGUoT)
- **Clifford Jr. Mespuk**, PhD (PNGUoT), MPhil (PNGUoT), BSVY (PNGUoT)
- **Noel Peya,** MPhil (PNGUoT), BSVY (PNGUoT)
- **Resila Karipal,** MPhil (PNGUoT, BSVY (PNGUoT)

Laboratory Manager

- **Alois Napitalai,** Diploma (Thomson Education Direct, Australia)

Principal Technical Officer

- Edward Buidal, BTSR. (PNGUoT), Diploma (PNGUoT)

Senior Technical Officers

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- Joseph Yapakae**,** Diploma (PNGUoT)
- Heva Honeaki**,** BSVY (PNGUoT), Diploma (PNGUoT)

Technical Officers
- Maida Bonga**,** BSVY (PNGUoT), Diploma (PSTC)

Technical Assistant
- Mathilda Naiawi**,** BGEM(PNGUoT), Diploma in Geomatics (PNGUoT)

Administration Team

Senior Secretary
- **Clara Nasusu,** Basic Secretary Certificate, Stenographer Certificate (Goroka Business College)
- **Delilah Geparo,** National Certificate 1 (Bulolo Technical School)

Janitors
- **Jeremiah Gatoba**
- **Kali Kipu**

Degree Programs

The School of Surveying and Land Studies consists of three sections, Property Studies, Surveying and Geographic Information Science (GIS). The School primarily offers three undergraduate degree courses for the three sections mentioned. This includes a four-year academic program leading to a:

(a) Bachelor in Geographic Information Science (GIS)
(b) Bachelor in Surveying
(c) Bachelor in Property Studies

These degree programs are designed to produce surveyors, property managers, valuers, and GIS specialists who will be able to pursue careers in the industry, academia or government sectors. Surveyors update boundary lines and prepare sites for constructions, make measurements of property boundaries and provide data for engineering and construction projects. Property Managers and Valuers deal with property management, land administration, valuation of real properties, real estate planning and development. GIS specialists develop and manage spatial data infrastructures, systems and databases to store and retrieve geospatial data that may be derived from satellite and other remote sensing means like LiDAR, Radar, or Drones as well as conduct analysis from these datasets and produce maps.

The first year of each course is designed to form a common foundation upon which years 2, 3 and 4 of the separate professional options are based.

The courses of the School are specific but considerable overlapping of discipline areas is encouraged with the aim of producing broader based graduates. The School has good facilities including a comprehensive digital mapping, geographic information systems and remote sensing laboratory, state of the art global positioning systems technology and software, a spatial information science / cartographic processing laboratory and automated surveying systems in addition to the traditional surveying and mapping facilities.

Entry requirements for undergraduate programs (any one of the following):

i) **Surveying:** Grade 12 School Leavers: SAT_P Test Score, Minimum of B grades in Major Mathematics, English, Physics and Information Technology.
ii) **Property Studies:** Grade 12 School Leavers: STAT_P Test Score, Minimum of B grades in English, Minor and Major Mathematics and Social Science Subjects.
iii) **GIS:** Grade 12 School Leavers: SAT_P Test Score, Minimum of B grades in Major Mathematics, English, Physics and Information Technology.
iv) All non-school leavers entering into Surveying and Lands Studies programs: same as in school leaver requirements except that upon acceptance with the minimum requirement will do entry exams instead of STAT-P test.
v) Diploma from other universities will be selected on case-by-case basis.

Surveying is taught to students from Agriculture, Civil, Building & Architecture and Mining Engineering. All three courses Surveying, GIS and Property Studies are also offered during the holiday sessions through the GEOMATICS Program.

The School also offers postgraduate degrees ranging from Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) by research to course-work Master of Science (MSc) through Distance Mode.

Entry requirement for a MPhil Degree is Bachelor's Degree in Surveying, GIS or Property Studies with Merit and a GPA above 3.0 from a recognized university and MPhil/MSc Degree from a recognized university for the PhD program. As for the Master of Science in Surveying, GIS or Property Studies, a Bachelor's Degree with a GPA above 2.5.

COURSE STRUCTURE
BACHELOR IN GEOGRAPHICAL INFORMATION SCIENCE

First Year	**First Semester**		
Code	**Subject**	**Contact Hours**	**Credit**
CD111	Development Practice and Sustainability	6	14
PH111	Physics for Geomaticians	6	17
SV111	Fundamentals of Surveying and Survey Computation 1	6	15
MA117	Mathematics 1 S (A+B)	6	21
		24	**67**
First Year	**Second Semester**		
AC121	Principles of Accounting	6	21
SV121	Fundamentals of Surveying and Survey Computation 2	6	15
SV122	Fundamentals of Cartography and Computer Assisted Mapping	6	15
GI121	Basics of remote sensing, GIS and GNSS	6	15
		24	**65**
Second Year	**First Semester**		
Code	**Subject**	**Contact Hours**	**Credit**
MA215	Mathematics 2 S (A+B)	6	21
GI211	Introduction to GIS data structure and model	6	15
SV211	Introduction to Laws and Regulations	6	15
GI212	Digital cartography and map projection	6	19
		24	**70**
Second Year	**Second Semester**		
MA225	Mathematics 3 S (A+B)	6	21
GI221	Geography and Geographic visualization	6	15
GI222	Statistics for GIS	6	16
GI223	Advance Remote Sensing	6	15
		24	**67**
Third Year	**First Semester**		
Code	**Subject**	**Contact Hours**	**Credit**
GI311	Introduction to Programming	6	15
GI312	Photogrammetry	6	18
GI313	Spatial Modeling & Analysis	6	15
GI314	Satellite Image Processing	6	15
		24	**63**
Third Year	**Second Semester**		
GI321	Web Cartography & GIS	6	15

GI322	Geo-Database management	6	15
GI323	Research skill development/Management	6	18
GI324	RS GIS Field activity	6	04
		24	**52**

Fourth Year First Semester

Code	**Subject**	**Contact Hours**	**Credit**
GI411	Decision Support System	6	15
GI412	Remote Sensing Applications	6	15
GI413	RS & GIS (Part A) Project Proposal	11	15
GI414	Geoinformatics in Environmental, Natural resource and coastal management	6	15
		29	**60**

Fourth Year Second Semester

GI421	Geodesy & Mobile Mapping	6	15
GI422	GIS Applications	6	15
GI423	RS & GIS (Part B) Project Implementation	11	15
GI424	Geoinformatics in Earth Science, tectonic Hazard and infrastructure management	6	15
		29	**60**

Graduate Statement (GS)

The graduates will have in-depth knowledge about all aspects of spatial science and relevant fields of Geomatics. They will have skills to state-of-the-art hardware and software in Remote Sensing, GIS, Photogrammetry and Surveying for innovative research and development of entrepreneurship in geospatial sciences.

Course Learning Outcomes (CLOs)

On completion of the course the student will:

CLO1	Understand and utilize principles associated with satellite Remote Sensing, GNSS, GIS and their respective applications.
CLO2	Show proficiency in synthesizing essential Cartographic, Remote Sensing and GIS operations and demonstrate sound knowledge on the nature and properties of geospatial data
CLO3	To identify and perform data collection for RS and GIS analyses, including GPS, satellite imagery, and handling collateral data like topographic maps.
CLO4	Critically analyze and process satellite images in the spatial, spectral, and temporal domains
CLO5	Be competent in commercial and open-source software in performing complex geospatial analysis using spatial and aspatial data
CLO6	Apply geospatial technologies in solving geospatial problems of various domains such as environmental, natural resources, disaster, health, utilities etc.
CLO7	Develop skills to undertake spatial modeling and web-based GIS mapping for Decision Support Systems.
CLO8	Initiate, design, develop and manage GIS and remote sensing application projects from possible applications on land and natural resource developments, environmental monitoring and management, conservation, utilities and services, disaster risk reduction and disaster risk management etc.
CLO9	Perform complex quantitative data analysis to evaluate scientific hypotheses and arguments in remote sensing and geographic information science for decision making.
CLO10	Appreciate the impacts and applications of remote sensing and GIS for natural sciences, social sciences, the limitations of the technology and ethical use of the technology for the society at large.

SUBJECT DETAILS: BACHELOR OF GEOGRAPHIC INFORMATION SCIENCE
FIRST YEAR
GI 121 BASICS OF REMOTE SENSING, GIS AND GNSS

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Basics of Remote Sensing, GIS and GNSS
Subject Code:	GI121
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15 **(**3 Lectures + 3Tutorials)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

The subject provides students with an overarching introduction to remote sensing (RS), geographical information system (GIS) and global navigational satellite system (GNSS) and their core components and utilities in terms of natural and manmade resources management.

Subject Topics

1. Introduction of remote sensing and satellite orbital characteristics
2. Resolution of a sensor and scanning system
3. Introduction to Geographic Information System: concepts and principles of GIS, the functions and components of GIS
4. Spatial data and GIS data model: characteristics of geospatial data, methods of data capture and data conversion
5. Introduction to remote sensing and GIS software to handle spatial data sets.
6. Introduction of Global Navigational Positioning System

Subject Outline

Topic	Content
1. Introduction of remote sensing and satellite orbital characteristics	● Different stages of Remote Sensing, Electromagnetic radiation, Electromagnetic spectrum, satellite orbital characteristics and type of orbit for Remote Sensing purpose.
2. Resolution of a sensor and scanning system	● Different type of Resolution, Scanning system, Data rate, various types of Remote Sensing and available data sets
3. Introduction to Geographic Information System: concepts and principles of GIS, the functions and components of GIS	● Concepts of information systems and information management, Management of spatial information and sources of GIS data. ● Hardware and software components of GIS. Capture and conversion of spatial data for a GIS.
4. Spatial data and GIS data model: characteristics of geospatial data, methods of data capture and data conversion	● Spatial data, non-spatial data, raster data, vector data, Raster data model, Vector data model, Vector to raster data conversion and vice versa.
5. Introduction to remote sensing and GIS software to handle spatial data sets.	● ERDAS IMAGINE software and ArcGIS software. ● Handling of spatial and non-spatial data, data interpretation, signature curve, data analysis.
6. Introduction of Global Navigational Positioning System	● Satellite constellation, GPS signals and data, geo-positioning, control segment, space segments, user segment, GPS positioning types- absolute positioning, differential positioning.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Recognize different stages of remote sensing, electromagnetic radiation, and electromagnetic spectrum.
2. Understand satellite orbital characteristics and type of orbit for remote sensing purpose.
3. Be introduced to different type of resolution, scanning system, various types of remote sensing and available data sets.
4. Familiar to the various components of a GIS and the types of geospatial data
5. Be introduced to different remote sensing and GIS software to handle spatial data
6. Understand various satellite constellations leading to GNSS and understand basic principles behind GNSS and satellite ranging/distance measurement and geo-positioning.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 -	**Tests:** There will be 2 Tests contributing 20 % towards the final grade for the subject
Assessment 3 -	**Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject
Assessment 4 -	**Quizzes:** These are very short, short answer, or multiple-choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.
Assessment 5	**Final written examination:** A 3-hour written examination weighs 50%

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Lillesand & Keifer, (2015) Remote Sensing and Image Interpretation, 7th Edn. Published by Wiley and Sons ISBN 0-471-45152-5

References

- Longley, P. A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W., John Wiley and Sons Ltd, Chichester, Geographic Information Systems and Science, 4th Edn, 2015
- Spencer, J., Frizzelle, B. G., Page, P. H. and Vogler, J. B. (2003), Global Positioning System: a field guide for the social sciences. London: Blackwell Publishers.
- Gregory, I. N. (2003), A place in history: a guide to using GIS in historical research. Oxford: Oxbow Books.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SECOND YEAR
GI 211 INTRODUCTION TO GIS DATA STRUCTURE AND MODEL

Course(s): Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name: Introduction to GIS data structure and model
Subject Code: GI 211
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**3 Lectures + 3 Tutorials)
Delivery Mode On campus
Prerequisites: GI 121
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides details on type of data, data structure and data model for geographical information system. Student will learn about data capture, data input, data storing, data manipulation, data management, data analysis and modelling techniques to perform GIS in terms of natural and manmade resources management.

Subject Topics

1. GIS data: spatial data and non-spatial data and data structure
2. GIS data model
3. Data input, topology and topological data model
4. Attribute data and attribute data model
5. Spatial data analysis
6. Hands on training with ArcGIS software to handle, input, store, manage and analyse of spatial data

Subject Outline

Topic	Content
1. GIS data: spatial data and non-spatial data and Data structure	● Components of GIS: data, user, methods, hardware, software. Spatial data, non-spatial data, Image data, metadata. Raster data Vector data, Map objects and Geometry: Point, line, polygon. Higher level vector data: TIN, Dynamic segmentation, region.
2. GIS Data Model	● Raster data model: Elements of Raster data model, Raster data encoding and compression technique; Vector data model: Simple data model, topologic data model, network model, object-oriented data model
3. Data input, topology and topological data model	● GIS data input, Scanning, Image registration, digitization, digitization error and error handling, Concept of topology, Raster topology, Topological vector data model. topological error, Importance of topology
4. Attribute data and attribute data model	● Attribute data and its type, relation between attributes, attribute data model: Tabular ("flat file"), Hierarchical, Network, Relational, Objected oriented
5. Spatial data analysis	● Raster data analysis: Mapping distance, Interpolating to raster, surface analysis, statistical analysis; Vector data analysis: proximity analysis, overlay analysis
6. Hands on training with GIS software to handle, input, store, manage and analyse of spatial data	● Displaying and identifying features, Performing Attribute and spatial Query, Performing table join and exporting data, Performing map registration, digitization, attribution to the digitized layer, data classification and mapping, perform spatial data analysis and output.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Recall spatial and non-spatial data, geometry of map object and data structure in GIS
2. Recognise raster data model, encoding and compression techniques and vector data model
3. Demonstrate data input techniques, digitization error and topology and its importance
4. Illustrate type of attribute data and attribute data model in GIS
5. Analyse different techniques in raster and vector data analysis
6. Operate different GIS software to handle spatial data; data input, store, manage and analyse of geospatial data

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 -	**Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.
Assessment 2 -	**Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject
Assessment 4 -	**Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.
Assessment 5	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Burrough, P.A., and McDonnell, R.A., (2015), Principles of Geographic Information Systems, 2nd Edn., Oxford University Press, Oxford. ISBN: 0-19-823365-5

References

- Gregory, I. N. (2003), A place in history: a guide to using GIS in historical research. Oxford: Oxbow Books.
- Longley, P. A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W. (2015), Geographic Information Systems and Science, 4th Edn. John Wiley and Sons Ltd, Chichester,

Relevant Unitech Policies
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GI 212 DIGITAL CARTOGRAPHY AND MAP PROJECTIONS

Course(s): Bachelor of Geographic Information Science (NQF Level 7)
Subject Name: Digital Cartography and Map Projections
Subject Code: GI 212
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **19 (**3 Lectures + 3 Tutorial)
Delivery Mode On campus
Prerequisites: SV 122
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject will educate and train students to examine, distinguish and recognize the field of Digital Cartography as a modern discipline of map design, compilation and publication and its development alongside the advancements of computer technology. It looks at Cartography as a discipline that has transitioned from traditional practices of map- making and its complex set of conventions and techniques, through to the advancement of technology, which uses comprehensive computer application for performing a wide range of functions and analysis on geospatial data.

Subject Topics

1. Cartographic Communication Vs Visualisation & Semiology and Cognitive issues in Cartography.
2. Map Projections
3. Spatial arrangement of geographic phenomena, identifying levels of cartographic measurements.
4. Thematic mapping and geo-spatial data classification, statistical and graphical foundation.
5. Theory of colour and colour schemes
6. Cartographic animation and 3D cartography

Subject Outline

Topic	Content
1. Cartographic Communication Vs Visualization & Semiology and Cognitive issues in Cartography.	• Perception and design with cartographic abstraction, map execution and dissemination. Identifying data models for Digital Cartographic information, Geographical Information Systems.
2. Map Projections	• Properties of map projections, classification and choice of map projections. Identification and calculation of projection parameters. Determination of UTM zones
3. Spatial arrangement of geographic phenomena, identifying levels of cartographic measurements.	• Scale, reference and coordinate systems, map digitizing and digital databases. Geographic and cartographic database concepts. Sources of data, remote sensing and data processing.
4. Thematic mapping and geo-spatial data classification, statistical and graphical foundation.	• Choropleth, Proportional symbolizing, Cartogram, Isarithimic or Isoline, Dot, Flow and Dasymetric thematic Cartography. Multivariate Mapping and Modelling.
5. Theory of colour and colour schemes	• Colour Theory and Models, Colour Pattern Creation and Specification, Colour and Pattern Use. Typography and Lettering the Map.
6. Cartographic animation and 3D cartography	• Animation, Navigation Systems, Simulation, Interactive Cartography and Map as an Interface.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Conversantly discuss the theoretical and cognitive issues of thematic cartography.
2. Clearly articulate how the principles of the spatial arrangement of geographic phenomena, levels of measurement, visual variables that are applied to effectively symbolize geographic phenomena on thematic maps
3. Accurately describe and apply the Statistical and graphical foundations of thematic mapping, and apply to Data standardization and Data classification in thematic mapping.
4. Understand and apply the techniques of Thematic Mapping which include; choropleth mapping, Dasymetric mapping, Isarithmic mapping, proportional mapping, dot mapping, multivariate mapping, cartograms and flow maps.
5. Be familiar with the principles and applications of spatial data exploration, animation and electronic atlases.
6. Be familiar with and discern between different map projections systems and their application. Focusing on coordinate systems used in geodesy and its relationship to scale.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 5 **Final written examination:** A 2 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Arthur, H.R., Joel, L.M., Phillip, C.M., A, J.K., and Stephen, C.G., (1995) Elements of Cartography, 6thEdn., Wiley & Sons Inc, Canada. ISBN: 9-814-12638-1

References

- Gregory, I. N. (2003), A place in history: a guide to using GIS in historical research. Oxford: Oxbow Books.
- Longley, P. A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W., John Wiley and Sons Ltd, Chichester, Geographic Information Systems and Science, 4th Edn, 2015
- Spencer, J., Frizzelle, B. G., Page, P. H. and Vogler, J. B. (2003), Global Positioning System: a field guide for the social sciences. London: Blackwell Publishers.

Relevant Unitech Policies
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GI 221 Geography & Geographic visualization

Course(s): Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name: Geography & Geographic visualisation
Subject Code: GI 221
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**3 Lectures + 3Tutorial)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides students with an impression of Geography and Geographic Visualisation in relation to understand our environment with kind of mapping in terms of. place, region, location, movement, and human-environment interactions. We will explore the capabilities and limits of web tools for representing geographic data and examine how recent developments in geospatial technologies have influenced how we both use and produce maps.

Subject Topics

1. Structure of Physical Geography
2. Landforms and landscapes with Geomorphic Process
3. Atmosphere, Global Climates and Climate Change
4. Human Geography with interaction
5. Overview of Geographic Visualization, with data analysis
6. Web Cartography and virtual environment

Subject Outline

Topic	Content
1. Structure of Physical Geography	● Large-scale tectonic and structural landforms and small-scale tectonic and structural landforms
2. Landforms and landscapes with Geomorphic Process	● What is geomorphology? The geomorphic system and geomorphic materials and processes, Weathering and related landforms, Karst, Fluvial and Coastal Landforms
3. Atmosphere, Global Climates and Climate Change	● Electromagnetic radiation, Insolation over the globe, Energy transfer, Temperature structure of the atmosphere, Climate classification, Climate change and future challenges and adaption.
4. Human Geography with interaction	● Types of Resource, Types of energy and uses and their advantage and disadvantages, Energy Consumption Trends, Growth in Energy Use, Available Energy Sources in PNG, Political and Economic Factors, Issues & Analysis: Government Action and Energy Policy in PNG, Population Characteristics, A Population Growth Curve, Categories of Limiting Factors, Human Development and Measuring the Environmental Impact of a Population. Major Challenges, Environmental opportunities, Planning for sustainable Human development of SIDs
5. Overview of Geographic Visualization, with data analysis	● Different forms of the visualization of terrain and geographic environments, with the help of ERDAS IMAGINE software, ArcGIS software. Handling of spatial and non-spatial data, data interpretation and analysis.
6. Cartography and virtual environment	● Data Resources, Classification, & Symbolization, Thematic Mapping: Charts; Choropleth map, heatmap, isoline maps and etc. Technology and purposes, Interaction and navigation, Usability vs usefulness, Design and support technology, 3D visualization

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Relate the key concepts in physical geography of environmental systems, process linkages, variable scale, and "cause and effect" and how they transmit to the influence of climate, geology, and human activities in shaping the earth surface.
2. Identify the processes and read, interpret, and generate maps and other geographic representations as well as extract, analyze, and present information from a spatial perspective.
3. Interpret of global human population patterns, factors influencing the distribution and mobility of human populations including human societies, and local and global economic systems are integral to the principles of sustainable development.
4. Examine conversantly about emerging methods and tools used in the visual exploration, analysis, synthesis, and presentation of geospatial data.
5. Formulate how interactive GIS technology (e.g., motion sensing input devises and collaborative touch screen displays) and immersive virtual environment technologies (e.g., head-mounted displays, CAVE-like immersion systems, etc.) can be utilized for research and applied purposes.
6. Evaluate how emerging geospatial and visualization technologies enhance existing research methodologies and improve science communication

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject

Assessment 3 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 4 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- De Blij, H.J. and Muller, P.O. (2006), Human Geography: culture, society and space, 8th Edn., Wiley.

References
- Charlton. R. (2007), Fundamentals of Fluvial Geomorphology, Routledge Press, New York

Relevant Unitech Policies
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GI 222 STATISTICS FOR GIS

Course(s): Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name: Statistics for GIS
Subject Code: GI 222
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **16 (**3 Lectures + 3Tutorial)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides students with a form of mathematical analysis that uses quantified models, representations and synopses for a given set of experimental data or real-life studies. Statistics studies methodologies to gather, review, analyze and draw conclusions from data. Statistics teaches people to use a limited sample to make intelligent and accurate conclusions about a greater population. The use of tables, graphs, and charts play a vital role in presenting the data being used to draw these conclusions. This subject is aimed to build conceptual understanding on the various analysis generally adopted and practised in the domain of GIS & RS. This subject also emphasises on data analysis to address real world situations, commonly referred to as statistical analysis.

Subject Topics

1. Sampling and data preparation
2. Measurement of Central Tendency and Dispersion
3. Understanding of Shape of the Frequency Curve
4. Correlation theory
5. Hypothetical Testing
6. Spatial Distribution of dataset

Subject Outline

Topic	Content
1. Sampling and data preparation	● Different types of Sampling, Advantage & disadvantages of different types of sampling, Collection of data, Arrangement of data & making a frequency table, Understanding shape size and spread of data
2. Measurement of Central Tendency and Dispersion	● The Arithmetic Mean Computed from Grouped Data, Median and Mode, The Empirical Relation Between the Mean, Median, and Mode, Quartiles, Deciles, and Percentiles, The Range and Mean Deviation, The Semi-Interquartile Range, The Standard Deviation, Short Methods for Computing the Standard Deviation ,Properties of the Standard Deviation, Absolute and Relative Dispersion; Coefficient of Variation, Standardized Variable; Standard Scores and Z score, Location Quotient and Lorenz curve.
1. Understanding of Shape of the frequency curve	● Frequency curve, understand the skewness and kartosis, graphical distribution of dataset
2. Correlation Theory	● Linear Correlation, Measures of Correlation, The Least-Squares Regression Lines, Standard Error of Estimate, Coefficient of Correlation, Regression Lines and the Linear Correlation Coefficient, Correlation of Time Series, Sampling Theory of Correlation Sampling Theory of Regression, The Least-Squares Regression Lines, Standard Error of Estimate, Correlation of Time Series, Residual Mapping from Correlation. Functionality of auto correlation and semi variance

3. Hypothetical Testing	● Chi Square test, Contingency table, Gathering & Presentation of Chi-square data example Worksheet, Student's T test application of both in GIS for decision making
4. Spatial Distribution of dataset	● Enables one region to be compared to another by Nearest Neighbor, Importance of NN 1. Worksheet of NN and apply into GIS, Worksheet for Rank Size rule, Understanding shortest path analysis, The measure of accessibility, The measure of sinuosity-Shimbel analysis, worksheet preparation

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. List which graphical methods (pie charts, histograms, etc.) are appropriate for categorical and for quantitative variables
2. Describe the distribution's shape (skewed left, skewed right, symmetric, or multimodal), centre, and spread
3. Interpret situations where the correlation coefficient would not do a good job of summarizing the relationship between two variables.
4. Examine in-depth skills and an advanced understanding of the concepts behind modern tools for detecting, describing and estimating spatial patterns and trends.
5. Formulate in context that the regression method is used to estimate the average value of y when you know x and that individual values will vary around the predicted value.
6. Evaluate the result of a hypothesis test and explain the relationship between a confidence interval and a two-sided hypothesis test.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20 %)**
Quiz	**(10 %)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

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Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Murray R. Spiegel & Larry J. Stephens. (1999) Statistics, Schaum's outlines, 4th Edition.

References

- Silk, J. (1979), Statistical techniques in Geography, George Allen and Unwin, London
- Walford, P. (1995), Geographical Data Analysis, John Wiley and Sons Inc., New York

Relevant Unitech Policies
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GI 223 ADVANCE REMOTE SENSING

Course(s): Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name: Advance Remote Sensing
Subject Code: GI223
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**3 Lectures + 3Tutorial)
Delivery Mode On campus
Prerequisites: GI 121
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis
Remote sensing is an important technique for environmental monitoring and scientific analysis. This course builds on the fundamentals of remote sensing science and gradually moves towards advanced techniques and applications. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings satellite remote sensing. Ultimately, the course will empower students to delve more deeply into advanced issues in remote sensing and to work with image processing tools for their particular area of interest.

Subject Topics
1. Remote sensing concepts and systems; Electromagnetic radiation principles
2. Infrared and thermal Remote Sensing
3. Microwave Remote Sensing, Satellite RADAR technologies, LiDAR
4. Hyperspectral Remote Sensing
5. Role of Remote Sensing in Earth and environmental science
6. Digital revolution in Remote Sensing

Subject Outline

Topic	Content
1. Remote sensing concepts and systems; Electromagnetic radiation principles	• Definition of terms, characteristics of EMR, • Interaction with atmosphere, • Interaction with ground objects
2. Infrared and thermal Remote Sensing	• Thermal process and properties, • Characteristics of Infrared image and its detection
3. Microwave Remote Sensing, Satellite RADAR technologies, LiDAR	• Active and passive sensors, • LiDAR, RADAR system, • RADAR return, image characteristics
4. Hyper spectral Remote Sensing,	• Hyperspectral information extraction, applications
5. Role of Remote Sensing in Earth and environmental science	• Role of Remote Sensing in the field of meteorology, oceanography, oil and mineral explorations,
6. Digital revolution in Remote Sensing	• Trends & limits of Remote Sensing technology, roundup

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain Remote Sensing principles and its importance as a modern technology.

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2. Interpret and analyse thermal, hyper-spectral and synthetic-aperture-radar (SAR) images with a variety of remote sensing software packages used by professionals in this field.
3. Examine satellite imagery to derive important land surface parameters such as temperatures, snow cover, soil moisture, forest fire, etc
4. Apply mathematical relationships describing fundamental physical, geometric, and computational principles relevant to remote sensing.
5. Identify Remote Sensing roles and trends for environmental monitoring and sustainable use of natural resources.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

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Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Campbell, J. B. and Wynne, R. H., (2011), Introduction to Remote Sensing, 5th Edition, Guilford Press, New York, ISBN-13: 978-160918-176-5 (print), 978-160918-176-5 (e-book).

References

- Jensen, J.R., (2016), Introductory Digital Image Processing – A Remote Sensing Perspective, 4th Edition, Pearson Prentice Hall, ISBN-13: 978-0-13-405816-0 (print), 978-0-13-411022-0-6 (e-book).
- Richards, A. J., (2013), Remote Sensing Digital Image Analysis: An Introduction, 5th edition, Springer, ISBN-13: 978-3-642-30061-5 (print), ISBN-13: 978-3-642-30062-2 (e-book).

Relevant Unitech Policies
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THIRD YEAR
GI 311 INTRODUCTION TO PROGRAMING

Course(s):	Bachelor of Geographic Information Science (BGISc (NQF Level 7)
Subject Name:	Introduction to Programing
Subject Code:	GI 311
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3Tutorials)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis
The subject is an introductory course in computer programming. The course is designed to acquaint students in applying software development methodologies and programming in GIS projects. Employ basic syntax and semantics to programs. Demonstrate basic stream and file Input/output (IO).

Subject Topics
1. Introduction to Programming
2. Programming Sequences using Python
3. Programming sequences and GUI Python
4. Creating and Manipulating Objects in MapBasic
5. Thematic Mapping using MapBasic

Subject Outline

Topic	Content
1. Introduction to Programming	● Introduction to Programming ● Introduction to Python Variables, Types and Expressions
2. Programming Sequences using Python	● Functions and Procedural Abstractions ● Files and Streams ● Branch and Loop Statements
3. Programming sequences and GUI Python	● Array and Strings ● Pointers ● Recursions
4. Creating and Manipulating Objects in MapBasic	● Introduction to Map Basic Fundamentals ● MapBasic Elements ● MapBasic integration with MapInfo Professional ● Manipulate graphical objects and maps using MapBasic
5. Thematic Mapping using MapBasic	● Creating thematic maps with MapBasic, the shade statement, Classification map generation ● Using arrays to store range values and style values. ● Review and summary

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Have an understanding of the role of computation in problem solving.
2. Design and use algorithms in the processing programming environment.
3. Demonstrate the ability to correct, test and debug processing programs.
4. Explain and have an understanding of the different programing languages used in the field of Geo-Informatics

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5. Write simple to basic programming language; Python, MapBasic, JavaScript; and to incorporate those languages into automating geospatial processes in existing geospatial software.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no written examination.

Students must also refer to the Subject Assessment Details.

Tests	**(50%)**
Assignments	**(40%)**
Quiz	**(10%)**

Assessment 1 - **Tests:** There will be two tests each weighing 25%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Assignment/Group work:** There will be one written assignment weighing 40%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** There will be one quiz weighing 10%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Andrew, J 2016, Python the ultimate beginner's guide! 2nd edn, CreateSpace Independent Publishing Platform, ISBN-13: 978-1530918157 (print).

References

- Felix, A 2016, PYTHON: Easy python programming for beginners, your step-by-step guide to learning python programming, CreateSpace Independent Publishing Platform, ISBN: 1539509664, 9781539509660.
- Richard, LH 2011, Learning to program with python, Southern Adventist University, http://ce.sharif.edu/courses/96-97/2/ce153-6/resources/root/Learn-to-Program-with-Python.pdf(e-book).

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 312 Photogrammetry

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Photogrammetry
Subject Code:	GI 312
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**18 (**3 Lectures + 3Tutorial)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Photogrammetry is the science and technology of obtaining reliable information about physical objects and the environment from photograph, enabling measurement of objects that in general is beyond our reach.

This course intends to provide an overview of existing photogrammetric technologies and to introduce emerging technologies in the field of photogrammetry such as drone. Major aspects of photogrammetry covered in this course are: aerial photography and its development to present day, aerial camera technology and components, manual photo interpretation, principal photogrammetric activities, aerial photo scale, elements of visual interpretation from air photo, height from single photo, measurement and feature extraction, stereoscopy, parallax, applications of photogrammetry - accuracy assessment, relief displacements and corrections, concept of soft copy photogrammetry, mission planning.

Familiarize with latest technologies – drones. At the end of the course, students should be able to determine both qualitative and quantitative characteristics of objects from aerial photographs. Quantitative extraction of information will be demonstrated through mathematical approach and so students are required to have fair competency on grade 12 Mathematics. Teaching methodology will be based on (online) lectures and individual assessments.

Subject Topics

1. Introduction to Photogrammetry; Nomenclature of aerial photos
2. Aerial Camera System; Geometric Elements of aerial photo
3. Scale of Photo; Measurement with aerial photo
4. Aerial photo interpretation (manual)
5. Photographic mission planning
6. Evolving photogrammetric technology – drone

Subject Outline

Topic	Content
1. Introduction to Photogrammetry; Nomenclature of aerial photos	● Definition of terms, characteristics and scope of photogrammetry, major institutes and publications, overview of development in photogrammetry, various type of aerial photos based on films, filters/colours, orientation of optical axis, scale, angle of coverage.
2. Aerial Camera System; Geometric Elements of aerial photo	● Major components of aerial camera and their functions including camera body, lens assembly, filter, aperture and shutter, suspensions, motion dampers and stabilizing gears, films and magazines, inner cone and vacuum, focal plate and focal plane. multispectral camera, photogrammetric elements and terms including flying height, exposure station, air base, fiducial marks, conjugate principal point, overlaps, iso-centre, drift, etc.
3. Scale of Photo; Measurement with aerial photo	● Type of scales and their units, representative fraction, graphic scale and its advantages, mathematical problems on ground distance and photo distance, measuring distances along straight line as well as curved lines, primary scale and extension scale and how to read them. ● Space coordinate (vertical) photograph, height measurement from single photo, relief displace and correction, areas measurement techniques – transect, dot method and grid method, parallax and its measurement, locating ground

	coordinates and measuring distance between coordinates, height measurement from pair of stereo photo.
4. Aerial photo interpretation (manual)	● Image analysis task and ordering, manual procedure and degree of complexity, elements of image interpretation, primary: tone/colour, secondary: shape, size & texture, tertiary: pattern, height, shadow, higher: site, association, convergence of evidence, application on forest.
5. Photographic mission planning	● Objectives of mission, advantages of mission planning, flight conditions, weather conditions, overlap, scale variation and tolerance, computation of row and path numbers, total photographs, photographic ground control, accuracy standard and testing.
6. Evolving photogrammetric technology – drone	● Introduction to drone technology, drone components, maintenance and control, importance of drones in photogrammetry, stages of evolution, rapid surveying & mapping, drone output and post processing (software), inventory measurement and accuracy, 3d model, commercial applications, case study, limitations and future scope.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain various photogrammetric principals and describe photogrammetric equipments and their functions.
2. Interpret various photogrammetric data and recognize different land cover, land use features from aerial photographs.
3. Collect quantitative data/information from aerial photos.
4. Measure linear and volumetric features from aerial photos.
5. Evaluate errors such as radial displacement, relief displacement and apply correction.
6. Design flight missions for effective and highest productive outcomes.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(25 %)**
Assignments	**(5%)**
Quiz	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 25% towards the final grade for the subject. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Assignment:** There will be one written assignment weighing 5%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher to re-emphasize topics based on learners' need.

Assessment 3- **Quizzes:** There will be two quizzes weighing 10% each. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, labeling diagrams, etc. Feedback will assist teacher to re-emphasize topics based on learners' need.

Assessment 4 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Paine, D. P. and Kiser, J. D., (2012), Aerial Photography and Image Interpretation, 3rd Edition, Wiley, ISBN-13: 978-0470879382 (print), 978-1118112649 (e-book).

References

- Linder, W., (2018), Digital Photogrammetry, 4th Edition, Springer, ISBN-13: 9783662570630 (print), 978-3662504628 (e-book).

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 313 Spatial Modeling & Analysis

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Spatial Modeling & Analysis
Subject Code:	GI 313
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3Tutorial …etc …)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Spatial analysis is the set of all possible mathematical/statistical analysis with spatial datasets to address environmental queries and challenges in the GIS domain. The said mathematical analysis can be re-purposed for various spatial datasets under different parameters by the use of spatial modeling.

This course intends to provide students with the knowledge and skills necessary to investigate the spatial patterns, which result from social and physical processes operating on or near the Earth's surface. The focus is on understanding the essential theoretical concepts of spatial analysis, including measures of geographical data distribution, spatial autocorrelation and interpolation, to find and apply the best analytical tool for solving GIS based problem and to correctly and appropriately interpret and present outputs. Students are required to have fair competency on grade 12 Mathematics. Teaching methodology will be based on (online) lectures, computer based practical and individual assessments.

Subject Topics

1. Modeling in spatial science
2. Overview of spatial analysis in GIS
3. Raster data model and analysis; Raster classification as a zonal operation
4. Vector data model and analysis
5. Advanced spatial analysis - Point pattern analysis
6. Advanced spatial analysis – Interpolation techniques

Subject Outline

Topic	Content
1. Modeling in spatial science	● Introduction to spatial modeling; taxonomy of models: deductive, inductive, deterministic, stochastic models, etc, use of model builders in standard GIS software; sample models on DEM analysis, suitability analysis, hyperspectral analysis, vegetation analysis, etc
2. Overview of spatial analysis in GIS	● Levels of GIS: descriptive, analytical, predictive; analysis with raster data: neighbourhood, raster modeling; analysis with vector data: spatial measurement, centrographic statistics, buffer analysis, spatial aggregation, spatial overlay and joins; analysis based on attribute data: record selection and aggregation, variable recoding, general statistical analysis, table relate and join; advanced spatial analysis: proximity analysis, network analysis, surface analysis, thiessen polygon.
3. Raster data model and analysis; Raster classification as a zonal operation	● Elements of raster data: origin, pixel, location and value, resolution, bands; various raster data type and their effect on computer storage and memory, raster data models and encryption techniques: cell-by-cell, run length, quad tree; environment and characteristics of raster data analysis, analysis type: local, zonal, etc; ● Zonal clustering based on popular algorithms; practical exercises on NDVI, filtering, clustering, classification, re-coding to demonstrate raster analysis.

4. Vector data model and analysis	● Elements of vector data: points, lines, polygons, vertices, nodes; overview of vector generation and its limitations; geo-relational vector model, object oriented vector model; vector topology (clean-built); practical exercises on buffering, overlay, dissolve to demonstrate vector analysis; comparison of raster and vector data models.
5. Advanced spatial analysis- Point pattern analysis	● Describing point pattern, centrography, density based point pattern measurement, quadrant count measurement, distance based analysis, average nearest neighbour, pair correlation function; spatial autocorrelation.
6. Advanced spatial analysis - Interpolation techniques	● Global Moran's I, local Moran's I, spatial interpolation, deterministic approach: proximity interpolation, inverse distance weightage, statistical approach, trend surfaces, kriging, variograms.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Construct and apply spatial models including surface models.
2. Describe standard raster and vector data models and their integrity in spatial analysis.
3. Plan, design and implement spatial analysis demonstrating the ability to select, apply and critically interpret appropriate methods for analysing geographical information.
4. Demonstrate proficiency in executing spatial analysis with standard GIS software.
5. Explain point patterns including clustering, for illustrating spatial processes.
6. Identify the central role of spatial interpolation in spatial analysis and apply suitable interpolation techniques to achieve reliable predictions.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Laboratory	**(10%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30 % towards the final grade for the subject.

Assessment 2 - **Laboratory and field work (if any)** The Laboratory and field work will contribute 10% towards the final grade for the subject.

Assessment 3 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 5% towards the final grade for the subject

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 5%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

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Subject Text book

- Mitchel, A., (2005-2020), The Esri Guide to GIS Analysis (three volumes). Redlands, CA, Esri Press.
- 2020. Volume 1: Geographic Patterns and Relationships, 2nd Edition, ISBN-13: 9781589485792 (print), 9781589485808 (e-book).
- 2005. Volume 2: Spatial Measurements and Statistics, 1st Edition, ISBN-13: 9781589481169 (print), 9781589482951 (e-book).
- 2012. Volume 3: Modeling Suitability, Movement, and Interaction, 1st Edition, ISBN-13: 9781589483057 (print), 9781589483392 (e-book).

References

- DeSmith, M. J., Goodchild, M. F. and Longley, P. A., (2018), Geospatial Analysis- A Comprehensive Guide to Principles Techniques and Software Tools, 6th Edition, Troubador Publishing Ltd, ISBN-13: 978-1-912556-03-8, 978-1-912556-04-5 (print), 978-1-912556-05-2 (e-book).

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 314 Satellite Image Processing

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Satellite Image Processing
Subject Code:	GI 314
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3 Tutorial)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Satellite Image Processing is seen as one of the important field in the research and development sector and plays a vital role in the field of Remote Sensing, GIS, Agricultural Monitoring, Disaster Management, Resource planning and monitoring and many other fields. Satellite Image processing consists of the Images of the earth taken by the Artificial Satellite as a digital photograph and then process by computer to extract information. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings Satellite Image Processing. The course will empower student to explore deeply into utilization of image processing tool to process Satellite Image in their practical area of interest.

Subject Topics

1. Introduction to Digital Image Processing
2. Pre-Processing of Satellite Image – Image Restoration and Rectification
3. Satellite Image Enhancement, Improving the Information content in the Satellite image
4. Information Extraction - decision-making capability of the computer to recognize and classify pixels on the basis of their digital signatures
5. Accuracy Assessment and Change Detection

Subject Outline

Topic	Content
1. Introduction to Digital Image Processing	● Concept of digital image, digital image processing and its advantages, image compression techniques, image statistics
2. Pre-processing of Satellite Images– Image Restoration and Rectification	● Radiometric corrections, geometric corrections, geo-referencing
3. Satellite Image Enhancement , Improving the Information content in the Satellite image	● Contrast enhancement, band combinations, band rationing, spatial filtering, edge enhancement, special transformations, image fusion; image enhancement with RADAR and LIDAR datasets
4. Information Extraction - decision-making capability of the computer to recognize and classify pixels on the basis of their digital signatures	● Supervised and un-supervised classification techniques for land use / land cover mapping, Producing ratio images
5. Accuracy Assessment and Change Detection	● Hands on training on accuracy, assessment, and change detection and future trends in land use-land cover linkages

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Explain the principles of digital image processing and manipulation in remote sensing.
2. Understanding the stages of pre-processing task involving with Satellite Images.
3. Explain the principle of Image Enhancement techniques reflecting quality Image for efficient information extraction.

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4. Understand some vital aspects of Satellite Images to take on the fundamental image analysis tasks.
5. Examine satellite imagery to derive and extract important atmospheric, hydrological and land surface geographic parameters such as temperatures and Precipitation, Land Use Land Cover, Vegetation Cover, Soil parameter etc.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30 %)**
Laboratory and field work	**(10%)**
Assignments	**(5%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be two tests each weighing 15%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Laboratory and field work** There will be one laboratory assignment weighing 10%. Laboratory assignment will be conducted in computerized lab facilities, using Remote Sensing software offline. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. It is advisable that student should carry back-up drives. Student must not turn off laptops/computers nor leave the lab room nor delete any file before the computer based task is checked by the examiner. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Assignment:** There will be one written assignment weighing 5%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Jenson J.R., (2014). *Introductory Digital Image Processing – A Remote Sensing Perspective*, 4th Edition, Pearson Series in Geographic Info Science; ISBN: 978-0-134-05816-0.

References
Departmental Practical Modules on Satellite Image Processing.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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GI 321 Web Cartography and GIS

Course(s): Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name: Web Cartography and GIS
Subject Code: GI 321
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**3 Lectures + 3Tutorial …etc …)
Delivery Mode On campus
Prerequisites: GI 311, GI 212
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

Web mapping is the process of designing, implementing, generating and delivering maps on the World Wide Web. This subject encompasses Web GIS and Web Cartography, whereby web GIS mostly deals with technological concerns, whilst web Cartography additionally studies theoretic aspects such as: the use of web maps, the evaluation and optimization of techniques and workflows, the usability of web maps, social aspects, etc. Web GIS or Internet GIS is related to web mapping but with an emphasis on analysis, processing of project specific geodata as well as exploratory aspects. Often the terms web GIS and web mapping are used synonymously. This subject emphasizes on the languages used to transmit high-quality vector graphics across the web, focusing on the varying web mapping architectures; and typical applications that are presented, such as real-time mapping, location-based services, and urban or regional planning.

Subject Topics

1. Introduction to Web Mapping
2. Web Interface Design
3. Quality of Service and Security in Web based GIS
4. Network Fundamentals of Web Mapping
5. Web based GIS/Cartography applications

Subject Outline

Topic	Content
1. Introduction to Web Mapping	● Web Mapping Evolution, concepts and definitions. ● Introduction to distributed systems and client/server computing.
2. Web Interface design	● Web Site Design process ● Web Interface design requirement. ● Web page design problems
3. Quality of service and Security in Web based GIS	● Performance Issues ● Usability Issues ● Security Issues
4. Network Fundamentals of Web Mapping	● Types of Network environments ● Network Communication protocols ● Communication models ● The Internet Environment ● Web Mapping Software
5. Web based GIS/Cartography Applications	● Concepts of GIS error and correction ● GML, HTML, XML ● Application Sites – Examples ● Recent Trend in Web based GIS

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Introduce the fundamental principles of publishing map and GIS products on the WWW.
2. Explain how GIS can be developed and utilised in local intranet and the internet.
3. Compare the strengths and weaknesses of different strategies in providing GIS functionality.
4. Choose and defend a strategy for developing Web-based GIS application.
5. Develop a Microsoft WWW server and design WWW home page for a variety of applications.

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Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(10 %)**
Laboratory assignment	**(15%)**
Written Assignments	**(20%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 1 Test contributing 10% towards the final grade for the subject.

Assessment 2 - **Laboratory assignment:** There will be one laboratory assignment weighing 15%. Laboratory assignment will be conducted in computerized lab facilities, using Remote Sensing software offline. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. It is advisable that student should carry back-up drives. Student must not turn off laptops/computers nor leave the lab room nor delete any file before the computer based task is checked by the examiner. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Assignment:** There will be one written assignment weighing 20%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Peng, Zhong-Ren & Tsou, MH 2003, *Internet GIS – distributed Geographic Information Services for the Internet and wireless networks*, John Wiley & Sons

References

- Brandon, R & John, G 2010, *Introduction to client/server networking*', Apress, Online ISBN: 978-4302-3004-5 <http://compnetworking.about.com/od/networkdesign/l/aa050201a.htm>.
- Lynch, PJ & Horton, S 2002, *Web style guide*, 2nd edn, electronic book accessible via http://www.webstyleguide.com/index.html. (Copyright regulation allows you to print one chapter from this site).

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 322 Geo-Database Management

Course(s):	Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name:	Geo-Database Management
Subject Code:	GI 322
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3Tutorial …etc …)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	AC 121, GI 222
Subject Coordinator:	TBA

Synopsis

This subject builds on the concept and application of Database Management System (DBMS), DBMS refers to the technology solution used to improve and manage the storage and retrieval of data from databases. This subject teaches how DBMS offers an efficient approach to manage databases via an interface for users as well as workloads accessing the databases via applications. The subject delves into the database design phases, the varying types of DBMS, the integrity and security of the Data and the DBMS itself.

Subject Topics

1. Introduction to Databases
2. Overview and the requisites of Database design
3. Database models
4. Introduction to Structured Query Language (SQL)
5. Future Directions

Subject Outline

Topic	Content
1. Introduction to Databases	● Introduction to Data Base management systems (DBMS) ● Introduction to DBMS Software – MS Access ● Entities & Attributes, Conventional files vs Databases
2. Overview and the requisites of Database design	● Conceptual design ● Logical Database design and model ● Physical design
3. Database models	● Hierarchical Model ● Network Model ● Relational Model ● Object Oriented Model
4. Introduction to Structured Query Language (SQL)	● Information retrieval and update database by query language ● Integration and security of Database ● Data format types and DBMS query manipulation
5. Future Directions	● New Direction – from Database to Knowledge base ● The Intelligent Knowledge based system of the future

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Construct database files
2. Create query and view files and demonstrates their uses.
3. Design and write programs using the database.
4. Evaluate the application of database technology for a given situation.
5. Determine the most suitable database structure for a given application.

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Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(15 %)**
Laboratory and field work	**(15 %)**
Assignments	**(15%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 1 Test contributing 15% towards the final grade for the subject.

Assessment 3 - **Assignment:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 15% towards the final grade for the subject

Assessment 4 - **Quizzes:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Connolly, TM. & Begg, CE 2014, *Database systems: a practical approach to design, implementation, and management*, 6th edn, Pearson, New York.

References

- Bradley, J 1987, *Introduction to database management in business*, 2nd edn, Holt Riverhart & Wilston, New York.
- Raghu, R & Johannes, G 2020, *Database management systems*, 3rd edn, McGraw Hill, New York, USA.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 323 Research skill development/management

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Research skill development/management
Subject Code:	GI 323
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**18 (**3 Lectures + 3Tutorial …etc …)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Research is an important skill that needs to be inculcated into the student's academic development for both in studies and in work upon graduating. The subject is aimed at extending the students skills in research methodology and develop competency in the critical evaluation of research literature. It intends to broaden the student's skills crucial to undertaking a research project, from identifying suitable research topics and methodologies, to critically appraising academic literature, and applying the tools of research preparation, through executing the research and articulating on the qualitative and quantitative methods and finally confidently presenting and publishing the research results.

Subject Topics

1. Introduction to research and identification of proposed research topic
2. Research preparation
3. Planning strategies
4. Research methodologies
5. Literature review and writing skills
6. Research presentation and follow-up

Subject Outline

Topic	Content
1. Introduction to research and identification of proposed research topic	● What is research, and identification of proposed research topic, methodology and hypothesis
2. Research preparation	● Problem formulation, research design, objectives and scope, research ethics
3. Planning strategies	● Planning strategies, information sources, time management, teamwork, and field work
4. Research methodologies	● Research methodologies appropriate to geospatial information science and geomatics engineering.
5. Literature review and writing skills	● Abstracting and paraphrasing, citations, and bibliographies, evaluating and writing research report
6. Research presentation	● Research presentation and follow-up; layout, style, publications, and follow-up strategies

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Independently obtain the essential knowledge to carry out meaningful research
2. Identify appropriate research topics and methodologies
3. Use tools and techniques to organise research, data management tasks and analysis efficiently
4. Apply tools of research preparation including problem formulation, undertaking literature review, research design, developing a hypothesis, ethical implications, and accessing resource implications
5. Carry out appraisals of academic literature and articulate the contributions of qualitative and quantitative methods specific to the geospatial science and geomatics engineering
6. Develop academic paper/report writing skills and understand the structure of publication

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Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Practical Assignment	**(15%)**
Written Assignments	**(10%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be two tests each weighing 20%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Practical Assignment:** There will be one practical assignment weighing 15%. Practical assignment will be conducted in the tutorial classes initially, in groups of 4 students to discuss and brainstorm on possible topic to research. Each student will take the assignment tasks to their lodging facility, where the tasks would be continued and completed using the library, study materials and the internet to undertake the research. The submission would be to specified format and referencing. Feedback will assist teacher evaluate cognition and skill development

Assessment 3 - **Written Assignment:** There will be one written assignment weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect to fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Creswell, J. W., (2014), *Research Design: Qualitative, Quantitative and Mixed Approaches*, 4th Edition, Sage Publications Inc, Los Angeles, ISBN 978-1-4522-2610-1

References

- Kumar, R., (2011), *Research Methodology: A step-by-step guide for Beginners*, 3rd Edition, Sage Publications Inc, ISBN 978-1-84920-301-2.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 324 RS GIS Field Activities

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	RS GIS Field Activities
Subject Code:	GI 324
Duration:	13 Teaching weeks
Contact Hours:	40 hrs (1-week field activity + 2 weeks of report writing & processing of field data).
Credit Points:	**04 (**3 Lectures + 3Tutorial)
Delivery Mode	Field/Outside campus
Prerequisites:	GI 121, GI 211, GI221
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This course aims to give the student knowledge and skills about commonly used methods and techniques in field activities. Under supervision, the students will work as groups/alone/small group to carry out a field-based research project dealing with climate and environmental reconstruction in a defined field area, in either same province or other provinces within PNG. This fieldwork work is an essential part of the study of Geography as well as RS & GIS. Appropriate field surveys, implementation, analysis and presentation of the results. Ultimately, the course will empower students to explore more issues in related to what happen in the field and how to incorporate in software to work with image processing tools for their particular area of interest.

Subject Topics

1. Features Extraction through image processing techniques using ground data.
2. Land use /land cover change detection: A spatio-temporal approach using satellite data
3. Water velocity and River Profiling study
4. Coastal erosion measurement
5. Forest density measurement by conventional method.
6. DCDB updating

Subject Outline

Topic	Content
1. Features Extraction through image processing techniques using ground data	● Interaction with satellite data in respect to ground objects identification for understanding the features
2. Land use /land cover change detection: A spatio-temporal approach using satellite data	● Understand a spatio-temporal change in a particular area. How it will change with the time.
3. Water velocity and River Profiling study	● Measure the river water velocity and river longitudinal and transverse profiling the emotional rate and amount of water following in the river.
4. Coastal erosion measurement	● Quantifying coastal change is essential for calculating trends in erosion, evaluating processes that shape coastal landscapes, and predicting how the coast will respond to future storms and sea-level rise. Study may include shoreline position, sandbar migration, rip-channel formation, wave run-up on the beach, alongshore current.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Analyse the problems of physical as well as cultural environments of both rural and urban areas. Moreover, they will try to find out the possible measures to solve those problems.
2. Interpret the observe, collect, and process geographic data with state of the art technology, including GIS, Remote Sensing, GPS, field data collection instruments, as well as obtaining data from document and literature sources with the help of software.

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3. Examine satellite imagery to derive important land surface parameters such as Coastline, Urban change detection, temperatures, forest cover, soil moisture, forest fire, etc.
4. Apply knowledge about relevant field methods and techniques used in their field area.
5. Identify Remote Sensing roles and trends for environmental monitoring and sustainable use of natural resources.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a 100% continuous assessment.

Students must also refer to the Subject Assessment Details.

Attendance and work ethic in the field	**(10 %)**
Laboratory Task	**(20%)**
Report Writing	**(50%)**
Viva-Voce	**(20%)**

Assessment 1 - **Attendance and work ethic in the field:** Course supervisor will be keeping on eyes upon you in the field exercises how best you give your output into the field task and your behaviour is the most important. 10% marks will be assigned for this task.

Assessment 2 - **Laboratory and field work (if any)** There will be one laboratory task after field to prepare different type maps which will weigh 20%. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Report Writing :** There will be a maximum 50 pages' field report submitted by the students after back from the field. It will carry 50% marks. Before submitting the report course coordinator provided details marking criteria to the students.

Assessment 4 - **Viva-Voce:** There will be an interview after submitting their field report. A three panel members will judge their knowledge what they learn in the field at par the field report. In these formative assessments, student face questions from the panel in relation to field visit. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject. It will carry 20% marks

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Teeuw, R., Whiteside, M., McWilliam, N., Zukowskyj, P., (2005), *Field Techniques: GIS, GPS and Remote Sensing*, Royal Geographical Society with IBG, ISBN: 978-0-907649-88-5

References
- Jensen, J.R., (2016), *Introductory Digital Image Processing – A Remote Sensing Perspective*, 4th Edition, Pearson Prentice Hall, ISBN-13: 978-0-13-405816-0 (print), 978-0-13-411022-0-6 (e-book).
- Richards, A. J., (2013), *Remote Sensing Digital Image Analysis: An Introduction*, 5th edition, Springer, ISBN-13: 978-3-642-30061-5 (print), ISBN-13: 978-3-642-30062-2 (e-book).

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI411 Decision Support System (DSS)

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Decision Support System (DSS
Subject Code:	GI 411
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3Tutorial …etc.)
Delivery Mode	On campus
Prerequisites:	GI311 and GI322
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

A decision support system (DSS) is a type of management support system that deals with ad hoc and unique problems which are complex and integrated, particularly at top management levels. It utilizes decision rules, models and model base coupled with a comprehensive database and the decision maker's insights leading to specific implementable decisions in solving problems. GIS is in fact, a DSS in that, it provides solutions to decision makers from spatial analysis about real world problems concerning any particular geographic phenomena whether natural or cultural at or over a geographic space (location). The systematic spatial applications can range from areas such as Geography and Planning (urban planning processes), Operations Research/Management Science (asset and resource management), Environment and Natural Resource (ecology, watershed, and forestry) and even Public Health Informatics (support for high risk areas of disease outbreaks). All such systems have the application perspective of integrating DSS and GIS into what is called the 'Spatial Decision Support System' (SDSS) which supports users (decision makers) in achieving a highest effectiveness in solving semi-structured spatial decision problems. Accordingly, SDSS development is the ultimate focus in this subject.

Subject Topics

1. Overview of Management Support Systems (MSS)
2. Decision Making, Systems, Modelling and Support
3. Decision Support System - Overview
4. Spatial Decision Support System (SDSS) - Overview
5. SDSS Development Tools
6. SDSS Development
7. Developing a Desktop SDSS

Subject Outline

Topic	Content
1. Overview of Management Support Systems (MSS)	● Concepts leading to decision making, Management Science and MSS definitions, Framework for DSS, DSS Characteristics and benefits, and Evolution of computerized decision aids
2. Decision Making, Systems, Modelling and Support	● Concept of Decision Making and Problem Solving, System Structure: Effectiveness & Efficiency, Modelling process, and Support
3. Decision Support System (DSS) - Overview	● DSS definitions, DSS characteristics & capabilities, Components of DSS: Data Management Subsystem, Model Management Subsystem, and Communication (dialogue) Management Subsystem
4. Spatial Decision Support System (SDSS) - Overview	● SDSS definition, SDSS characteristics and features, SDSS architecture – Main Components: Database Management System (DBMS), Model-base Management System (MBMS), Display Generator, Report Generator, and User Interface (GUI)

5. SDSS Development Tools	● SDSS Software, GIS Software used in SDSS, Problem-specific SDSS, Domain-oriented SDSS, Generic SDSS
6. SDSS Development	● Building SDSS Software, SDSS Software Components, Common Software for Utilization in SDSS Development, SDSS Development by Software Integration, Integration Technologies & Strategies
7. Developing a Desktop SDSS	● Enabling Technologies for the Development of Desktop SDSS, Programming Languages, Application Development Environment, Spatial Libraries, SDSS Development Considerations, SDSS Development Process

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Develop knowledge about spatial and non-spatial Decision Support Systems (DSS).
2. Combine analytical model and spatial data in flexible manner to be able to support decision making problems.
3. Understand and apply the integration of GIS and DSS in developing what is known as the Spatial Decision Support System (SDSS) based on the application perspectives
4. Design and develop software based SDSS whether commercial or open-source and concerning both natural and cultural phenomena.
5. Support a variety of Spatial Decision Support Systems that are easily adopted to provide new capabilities as the need of the user evolves.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Practical Assignment	**(15%)**
Written Assignments	**(5%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Practical Assignment** There will be one practical assignment weighing 15%. The practical assignment will be a major practical task conducted over a period of time (usually weeks) using specialized GIS and Remote Sensing Software offline. Students will be applying acquired GIS and Remote Sensing skills in pre-processing, analyzing and finally presenting and reporting the task conducted respective to the systematic application of their skills and knowledge. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Written Assignment:** There will be one written assignment (weighing 5%. Student will take away the assignment tasks to their lodging facility where it can be completed using information from internet sources and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** There will be two (2) quizzes each weighing 5%. Quizzes are a consolidating mind sport emphasizing on the lessons learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, multiple choice, systematic diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

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Subject Text book

- Sugumaran, R. and DeGroote, J. (2010) *Spatial decision support systems: principles and practices*. International Journal of Geographical Information Science, 25:11, 1907-1909, doi: 10.1080/13658816.2011.565475

References

- Degroote, J. Sugumaran R. 2011. *Spatial Decision Support Systems: Principles and Practices*. Taylor and Francis Group, LLC. (e-book)
- Turban E. 1990. *Decision Support and Expert Systems: Management Support Systems (2nd ed.)*, 866 Third Avenue, New York, New York 10022: Macmillan Publishing Company.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 412 Remote Sensing Applications

Course(s):	Bachelor of Geographic Information Science (BGISc) ((NQF Level 7)
Subject Name:	Remote Sensing Applications
Subject Code:	GI412
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**3 Lectures + 3Tutorials)
Delivery Mode	On campus
Prerequisites:	GI223, GI312, GI314, AC121, GI222
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This subject builds on the concepts of Remote Sensing as a technology and its history. It delves into the properties of the EMR and its interaction/reaction with features on the Earth. This subject investigates further into Earth surface data as seen by the sensors in different wavelengths (reflected, scattered and/or emitted) is radiometrically and geometrically corrected before extraction of spectral information. RS data, with its ability for a synoptic view, repetitive coverage with calibrated sensors to detect changes, observations at different resolutions, provides a better alternative for natural resources management as compared to traditional methods. The subject encompasses passive to active remote sensing technologies and their derived applications.

Subject Topics

1. Image Pre-processing
2. Image Interpretation and Image Classification
3. Natural Resources Application(s)
4. Post Classification Accuracy and Report Generation
5. Temporal Change Detection and RS-Application and Summary

Subject Outline

Topic	Content
1. Image Pre-processing	● Introduction to Remote Sensing Applications ● Image registration: Single image, Image to image and map to image or image to map ● High resolution image registration using GPS coordinate
2. Image Interpretation and Image Classification	● Visual and digital image interpretation ● Introduction to thermal, hyper-spectral and microwave remote sensing. ● Land classification - supervised and unsupervised classification
3. Natural Resources Application(s)	● Remote Sensing on water resource mapping. ● Remote Sensing on forest resource mapping. ● Remote Sensing on earth science resource mapping. ● Remote Sensing on agriculture, soil, mineral geology resource mapping.
4. Post Classification Accuracy and Report Generation	● Ground truthing and plotting of collected point ● Recoding of classified image ● Accuracy report generation ● Error matrix and kappa statistics generation
5. Temporal Change Detection and RS-Application and Summary	● Change detection analysis and future trend ● Classification map generation ● Review and summary of the subject

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1 Demonstrate the potential of space technologies for natural resources surveying and environmental monitoring.
2. Executing remote sensing based applications.
3. Exploring spectral regions in Remote Sensing Data for different applications
4. Developing automated mapping /interpretation

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Written Assignments	**(25%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 -	**Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.
Assessment 2 -	**Written Assignment:** There will be one written assignment weighing 25%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.
Assessment 3 -	**Quizzes:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.
Assessment 5	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Lillesand, TM., Ralph, WK & Jonathan WC 2004/2008, *Remote sensing and image interpretation*, 5th or 6th edn, John Wiley & Sons, Inc., New York.

References

- Schill, S & Raber, G 2009, Protected area tools (PAT), user manual and tutorial, The Nature Conservancy, New York, USA.
- Course notes and other reading materials as directed by the course lecturer.
- Departmental Modules & Handouts and data provided through Google Classroom.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SGI 413 Remote Sensing and GIS (Part A) Project Proposal

Course(s):	Bachelor of Geographic Information Science **(BGISc** (NQF Level 7)
Subject Name:	Remote Sensing & GIS (Part A) Project Proposal
Subject Code:	GI 413
Duration:	13 Teaching weeks
Contact Hours:	11 Hours per week
Credit Points:	**15 (**0 Lectures + 0 Tutorial + Practicals /Consultation)
Delivery Mode	On campus
Prerequisites:	GI 323
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Student to investigate and identify a project, outline its goals, objectives and hypotheses if appropriate and research into the intellectual aspects of the project theme. This will involve: Development of a research or project proposal, literature reviews, set readings and abstracting; Data Collection and Fieldwork as appropriate; Data Analysis; Project Planning and Design; Write-up and an oral presentation in-person following a viva-voce examination format of the project proposal. The work will be undertaken with the guidance of a supervisor or supervisor(s), at least one of whom will be appointed from the academic staff of the Department. External Sponsor(s)/Supervisor(s) outside of the Department may also be involved.

Subject Topics

1. Project Introduction
2. Literature Review
3. Progress Presentation
4. Proposed Methodology/Analysis
5. Discussion / Conclusion and Final Presentation

Subject Outline

Topic	Content
1. Projection Introduction	● Background information provides an overview of the topic to be investigated. ● Appropriateness of aim, research question or testable hypothesis.
2. Literature Review	● Literature selected is appropriate to the aims of the study. ● There is critical analysis of the literature selected. ● Critical analysis is meaningful and of sufficient depth. ● Contrast & comparison of the literature is present. ● Literature review makes a clear case for the research question/ hypothesis, etc.
3. Progress Presentation	● Assess Validity of Progress Report through Formal Presentation
4. Proposed Methodology /Analysis	● Selection of research method is justified. ● Appropriate use of materials or equipment. ● Accessibility of equipment. ● Comprehensive description of proposed test procedure/ methodology. ● Estimate of resource requirement. ● Description of an appropriate pilot study. ● Justification of proposed chosen method(s) of data analysis. ● Indication of outcome measure(s), including proposed levels of measurement.
5. Discussion / Conclusion and Final Presentation	● Indication of possible study limitations. ● Potential impact of study on wider community discussed. ● Appropriate summary of the main research proposal. ● Final Proposal Presentation

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Produce a well-constructed articulated research project proposal.
2. Discuss the research or project proposal with the supervisor and make a final articulate verbal and written presentation of the proposal.
3. Demonstrate the ability to carry out a defined literature review on a subject or topic.
4. Demonstrate the ability to analyse and synthesize research material accurately and concisely.
5. Demonstrate referencing skills

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no Final examination.

Students must also refer to the Subject Assessment Details.

Project Title & Synopsis	**(5%)**
Student-Lecture Consultations	**(10%)**
Oral Presentations (Viva-Voce Examinations)	**(35%)**
Written Research Proposal	**(50%)**
Final Examination	**(50%)**

Assessment 1 - **Project Title & Synopsis:** This assessment weighs 5%. The title of the proposal and its aim and objective(s) must be suitably defined and stated clearly with the intellectual enquiry being evident in the initial stage in the proposal. Feedback will assist the co-ordinator re-emphasize topics and assign a supervisor based on learners proposed topic of interest.

Assessment 2 - **Student-Lecture Consultations** This assessment weighs 10%. The student is required to have formal sessions with his/her supervisors, in order for the supervisor to assess whether the student demonstrates an intellectual grasp of the topic and understanding of the scope of the research proposal. Taking into consideration the relevant theoretical literature and the student's ability to demonstrate skills in making use of the literature and other relevant sources of information.

Assessment 3 - **Oral Presentations (Viva-Voce Examination):** There will be two presentations each weighing 15% and 20% respectively. The progress presentation and final presentation must be in English and should not exceed 10 minutes and 15 minutes respectively. The presentations must include the technical approach, literature reviewed and its contribution to the topic, the proposed methodology and preliminary experimental results with a future implementation work schedule. Feedback will assist the teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4 - **Written Research Proposal:** There will be a written research proposal weighing 50%. It is a requirement, though; that the proposal be based on a well-defined and clear research question/ aim with achievable objective(s) of scholarly significance, and that the proposal develops a theoretically and methodologically informed and evidence-based answer to that question/aim/objective(s). The word limit for the proposal is 22,000 words of text, exclusive of appendices, footnotes, tabular material, bibliography or equivalent. The research proposal must be proofread, edited, and technically of the high standard expected of scholarly outputs. The proposal must be written in a coherent, formal style and forms a well-ordered whole. The proposal must observe the conventions and practices of the chosen referencing style (any style can be used, as long as it is used consistently and correctly)

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
The Writing Lab & The OWL at Purdue 2020, *Writing a research paper*, Purdue University, Indiana, viewed 20 January 2021, <https://owl.purdue.edu/owl/general_writing/common_writing_assignments/research_papers/index.html>.

References

- American Psychological Association. 2010. Publication manual of the American Psychological Association, 6th Ed., Washington, DC.
- *Style manual for authors, editors and printers* 2002, 6th Ed., Wiley Australia.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 414 Geoinformatics in Environmental, Natural Resource and Coastal Management

Course(s):	Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name:	Geoinformatics in Environmental, Natural Resource and Coastal Management
Subject Code:	GI 414
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**2 Lectures + 2 Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites:	GI 121, GI 211
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This subject Geoinformatics in Environmental, Natural Resource and Coastal Management plays a vital role in the field of Remote Sensing, GIS, Environmental and Natural Resource and Coastal Management, planning and monitoring and other streams related to science, engineering and technology. Geoinformatics itself is a multidisciplinary subject that combines various aspects of science including physics, chemistry, biology, mathematics, etc. into one unit and makes use of technology and science to address and solve real world issues under concept of spatial information technology. It helps establish a connection among people, locations, etc. Under the discipline of Geoinformatics, the course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings Environment, Resource and Coastal Management.

Subject Topics

1. Resources use and management
2. Environmental issues and monitoring
3. Geo-environmental hazard mitigation
4. Mapping of natural hazards and disaster
5. GIS technology and special analysis in Coastal Zone Management
6. Integrated coastal zone planning and sustainability and GIS

Subject Outline

Topic	Content
1. Resources use and management	● Types of Resources, Development of Resources, Conservation of Resources, Renewable Resources: Forest resources, Water Resources; Mineral Resources, Food Resources, Land Resources, Energy Resources, Energy Resources as a fossil fuel, Alternative Sources of Energy Resources.
2. Environmental issues and monitoring	● Environmental conditions and trends, support policy development and its implementation, and develop information for reporting to national policymakers, international forums and the public, EIA, EIS, EI
3. Geo-environmental hazard mitigation	● Flood Analysis: Prevention, early warning, mechanism and mitigation; ● Air Pollution Analysis: Identify impacted areas, Locate pollutant sources, prediction over the time; ● Forest fire analysis and visualization.
4. Mapping of natural hazards and disaster	● Ground water monitoring analysis, Water Quality measurement, Urban heat analysis, Health hazard analysis

5. GIS technology and special analysis in Coastal Zone Management	● The language of coastal planning and management, Defining the coastal area, The unique characteristics of coastal areas, A brief history of coastal management and planning; Population growth and urbanization, Coastal use: ● Resource exploitation – fisheries, forestry, gas and oil, and Mining, ● Infrastructure – transportation, ports, harbors, shoreline protection works and defense, Tourism and recreation, ● Conservation reserves and protection of biodiversity, Impacts of human use, ● Pollution – industrial, sewage and runoff, ● Coastal hazards and climate change, Administrative and legal issues
6. Integrated coastal zone planning and sustainability and GIS	● Administrative coastal management and planning techniques: ● Policy and legislation and guidelines, ● Zoning, Regulation and enforcement, ● Social coastal management and planning techniques: ● Environmental impact assessment, ● Risk and hazard assessment and management, ● Landscape and visual resource analysis, ● Economic analysis, designing a coastal planning framework; ● Integrated coastal management plans described by geographic Coverage; ● Subject plans in coastal management; Coastal management plan production processes; ● The implementation of coastal management plans

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. To understand and explain the principles of Geoinformatics in Environmental, Resources and Costal Management within Geospatial context.
2. Examining different sources of resources and their availability and future prospect analysis in respect to Geospatial environment.
3. To understated the Environmental Impact Assessment within Geospatial Context.
4. Understanding the processes of analysing, monitoring and planning of Coastal Zone.
5. Explaining the benefits of Geospatial technology for management, planning and monitoring of existing environment resources and coastal zone.
6. Develop practical skill in the application of RS & GIS technology to real environmental problems.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(10 %)**
Assignments	**(30%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be one test weighing 10%. Test will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Assignment:** There will be two written/practical based assignments weighing 15% each. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3 -	**Quizzes:** There will be two quizzes weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.
Assessment 4	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- PK Joshi, P Pani, SN Mohapartra and TP Singh, (2009), Geoinformatics for Natural Resource Management, ISBN: 9781606922118, Nova Science Publishers

References

- Darius Bartlett, Louis Celliers, (2019), Geoinformatics for Marine and Coastal Management, ISBN 9780367873684, Publishers CRC Press
- Bird, E.C.F. (2000). An Introduction to Coastal Geomorphology, John Wiley and Sons Ltd. New York
- Carter, R.W.G. (1988). Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 421 Geodesy & Mobile Mapping

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	Geodesy & Mobile Mapping
Subject Code:	GI 421
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**2 Lectures + 2Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Precise positioning of objects on the surface of Earth requires prerequisite knowledge of the shape of Earth, the coordinate system used, etc – Geodesy deals with this information & much more. As the domain of Geodesy is quite vast, this course has been curtailed down around GIS disciplines as elaborated below.

Concepts of geodesy; size and shape of the Earth; geoid and ellipsoid; terrestrial, celestial and orbital co-ordinate systems; co-ordinate transformations; computations of positions in three dimensions; computations of positions on the ellipsoid UTM; P.N.G.s horizontal and vertical datum; height determination. Elements of inertial positioning; time systems; astronomic positioning; VLBI positioning; orbit computations; satellite laser ranging. Horizontal, vertical and three-dimensional networks; pre-analysis and post- analysis; theory of heights; gravimetry; global and local geoid determination; astro geodetic, gravimetric and combined methods; Basics of mobile mapping; capabilities; type of sensor and configurations; accuracy of mobile mapping and its applications.

Students are required to have fair competency on grade 12 Mathematics. Teaching methodology will be based on (online) lectures, mathematical problem solving and individual assessments.

Subject Topics

1. Basic concepts of Geodesy – Reference surfaces, datum
2. Geometric Geodesy -Coordinate systems & their transformations
3. Datum – Global & Local (PNG-94) - defining parameters & descriptions
4. Physical geodesy – Gravity & its variation, measurement & reduction techniques
5. Satellite geodesy – description of significant global satellite system
6. Mobile Mapping system

Subject Outline

Topic	Content
1. Basic concepts of Geodesy – Reference surfaces, datum	● Geodesy – definition & branches, brief historical development of Geodesy, Reference Surfaces, Orientation of reference spheroids, Datum, Geoidal parameters, Mean Sea Level,
2. Geometric Geodesy -Coordinate systems & their transformations	● Coordinate system overview, Geographical (spherical/curvilinear) coordinates system, Three dimensional geocentric Cartesian co-ordinates system & the Natural (Astronomical) co-ordinate system, Definitions of terms – latitude, longitude, origin, parallels, etc. Transformation with mathematical equations – between Astronomic & Geographic coordinates, between Geographic & Geocentric coordinates.

3. Datums – Global & Local (PNG-94) - defining parameters & descriptions	• Major global datum with defining parameters & descriptions – ITRF, WGS-84, PZ-90. Comparison between ITRF & WGS-84. Local datum for PNG. Overview of micro-plates & their movements. PNG-94 – defining parameters & brief historical development. Local vertical datum – PNG-08.
4. Physical geodesy – Gravity & its variation, measurement & reduction techniques	• Gravity – overview of fundamental concepts, Units, variation of Earth's gravity – reasons & anomalies, Gravity formula, gravity measuring instruments – basic principle & type, major reduction techniques – Free-air, Bouguer & Isostatic.
5. Satellite geodesy – description of significant global satellite system	• Definition, major satellite missions – descriptions, Very long Baseline Interferometry, GNSS, GPS, GLONASS, Galileo, BeiDou-1&2, NAVIC, DORIS, SLR & LLR.
6. Mobile Mapping system	• Introduction, Brief development of MMS, Range of sensors & platforms – RTK-GPS, VRS-GPS, etc., Key technology in geo-referencing – direct reading, Accuracy, Limitations, Applications

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Introduce basic concepts of geodesy, computations on the spheroid,
2. Understand the physical relationship between the geoid, spheroid
3. Explain National spheroid and PNG Map Grid (PNGMG).
4. Illustrate working principle of instruments for gravity measurement and compare their precisions.
5. Understand gravity models of physical geodesy.
6. Explain the concepts of mobile mapping technology and the type of sensor used & identify fields of mobile mapping and its advantages.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30 %)**
Written Assignments	**(10%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be two tests each weighing 15%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Written Assignment** There will be two written assignments weighing 5% each. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3 - **Quiz:** There will be two quizzes weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

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It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Ewing, C. E. & Michael, M. M. (1971), Introduction to Geodesy, 1st Ed., American Elsevier Pub. Co., ISBN-13: 9780444000552.

References

- Torge, W. & Muller, J. (2014), Geodesy, 4th Ed., De Gruyter, Berlin, ISBN-13: 978-3110207187
- Vanícek, P.& Krakiwsky, E.J. (1986), Geodesy, 2nd Ed., Elsevier Science, ISBN-13: 9780444877772 (print), 9781483290799 (e-book).

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI422 GIS Applications

Course(s):	Bachelor of Geographic Information Science (BGIS) (NQF Level 7)
Subject Name:	GIS Applications
Subject Code:	GI422
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15 **(**3 Lectures + 3Tutorial)
Delivery Mode	On campus
Prerequisites:	GI121, GI211
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This subject deals with various applications of GIS, as well as integration with Remote Sensing. Major areas of this subject is theory and practice of design, development and use of GIS for wide range of applications including; LIS, environmental management, natural resources, agriculture, business etc.

Subject Topics

1. Thematic mapping and map design
2. GIS error and mapping with high resolution data
3. LIS, LRS, SIS
4. Surface runoff and soil loss estimation
5. Mapping of natural resource and natural hazard
6. Decision support system for Market access and agriculture suitability

Subject Outline

Topic	Content
1. Thematic mapping and map design	● Thematic mapping principle, Normalization and classification, Map representation and composite mapping
2. GIS error and mapping with high resolution data	● Evaluate GIS error and its normalization methods, Land use land cover mapping using high resolution satellite data, its advantages and disadvantages
3. LIS, LRS, SIS	● Know about land information and Land record system, Design and develop prototype GIS for specific application, LIS and LRS, SIS
4. Surface runoff and soil loss estimation	● Know and develop data base based on theoretical knowledge for a specific problem, Develop practical experience in watershed mapping
5. Mapping of natural resource and natural hazard	● Water resource mapping and monitoring, Coastal and inland flooding, Landslide and Earth quake zone mapping, Mapping of renewable energy, Case study- climatological modelling
6. Decision support system for Market access and agriculture suitability	● Analyses and develop map for Market access for PNG, Preparation of agriculture suitability map for PNG, Starting up an open source software-QGIS, Review and Summary

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. To understand about thematic and land use land cover mapping from high resolution satellite data and its future trends.
2. Design and develop prototype GIS for specific application, Municipal GIS LIS and LRS, MIS
3. SLO3: Develop practical experience in watershed mapping and modelling of surface runoff, soil loss.
4. SLO4: To understated the probability and prediction of different natural hazard, like Coastal and inland flood risk, earth quake and Landslide.

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5. To analyses and develop map for Market access and agriculture suitability for PNG.
6. Develop practical skill in the application of GIS technology to real environmental problems.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(10 %)**
Assignments	**(30%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 -	**Tests:** There will be one test weighing 10%. Test will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.
Assessment 2 -	**Assignment/Group work:** There will be two written/practical based assignments weighing 30% each. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.
Assessment 3 -	**Quizzes:** There will be two quizzes weighing 10%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need
Assessment 4	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Burrough, P.A., and McDonnell, R.A., (2015), Principles of Geographic Information Systems, 2nd Ed., Oxford University Press, Oxford. ISBN: 0-19-823365-5

References

- Longley, P. A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W. (2015), Geographic Information Systems and Science, 4th Ed, ., John Wiley and Sons Ltd, Chichester,

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI423. Remote Sensing & GIS (Part B) Project Implementation

Course(s):	Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name:	Remote Sensing & GIS (Part B) Project Implementation
Subject Code:	GI423
Duration:	13 Teaching weeks
Contact Hours:	11 Hours per week
Credit Points:	**15 (**0 Lectures + 0 Tutorial + 11 Practicals/Consultation)
Delivery Mode	On campus
Prerequisites:	GI413
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Student to construct/implement a prototype and carry out testing or simulation & modelling of their research project. The students must work within the confines of the research project's goals, objectives and hypotheses if appropriate and research into the intellectual aspects of the project theme. This will involve: Implementation of their research or project proposal, literature reviews, set readings and abstracting; Data Collection and Fieldwork; Data Analysis; Project Planning and Design; Dissertation write-up and an oral presentation in-person following a viva-voce examination format of the research project. The work will be undertaken with the guidance of a supervisor or supervisor(s), at least one of whom will be appointed from the academic staff of the School. External Sponsor(s)/Supervisor(s) outside of the School may also be involved.

Subject Topics

1. Project Introduction
2. Literature Review
3. Presentation
4. Methodology/Analysis
5. Discussion / Conclusion and Final Presentation

Subject Outline

Topic	Content
1. Project Introduction	● Background information provides an overview of the topic to be investigated. ● Appropriateness of aim, research question or testable hypothesis.
2. Literature Review	● Literature selected is appropriate to the aims of the study. ● There is critical analysis of the literature selected. ● Critical analysis is meaningful and of sufficient depth. ● Contrast & comparison of the literature is present. ● Literature review makes a clear case for the research question/ hypothesis, etc.
3. Progress Presentation	● Assess Validity of Progress Report through Formal Presentation
4. Methodology /Analysis	● Research method is justified. ● Appropriate use of materials or equipment. ● Accessibility of equipment. ● Comprehensive description of test procedure/ methodology. ● Quantifying of resource requirement. ● Description of an appropriate pilot study. ● Justification of chosen method(s) of data analysis. ● Outcome measure(s), including levels of measurement.

5. Discussion / Conclusion and Final Presentation	• Indication of study limitations. • Potential impact of study on wider community discussed. • Appropriate summary of the main research project. • Final Proposal Presentation

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Develop the student's self-confidence in handling technical problems and or situation in Geographic Information and Mapping Sciences.
2. Develop in the student those attitudes and personal skills necessary to 'get the job done' within a specified time and resource constraints which includes documentation to an appropriate professional standard
3. Demonstrate the integration of all section of the student's formal education and bring them to bear on a substantial task.
4. Provide the students with opportunities to innovate by means of original design, analytical, experimental or research work and hence to demonstrate ability to contribute to the disciplines of spatial sciences at a high level.
5. Provide experience in the presentation of technical work in the form of an academic dissertation.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no Final examination.

Students must also refer to the Subject Assessment Details.

Student-Lecture Consultations (10 %)
Oral Presentations (Viva-Voce Examination): (40%)
Written Research Dissertation (50%)

Assessment 1 - **Student-Lecture Consultations:** This assessment weighs 10%. The student is required to have formal sessions with his/her supervisor(s), in order for the supervisor to assess whether the student demonstrates an intellectual grasp of the topic and understanding of the scope of the research proposal. Taking into consideration the relevant theoretical literature and the student's ability to demonstrate skills in making use of the literature and other relevant sources of information.

Assessment 2 - **Oral Presentations (Viva-Voce Examination):** There will be two presentations each weighing 15% and 25% respectively. The progress presentation and final presentation must be in English and should not exceed 10 minutes and 15 minutes respectively. The presentations must include the technical approach, literature reviewed and its contribution to the topic, the methodology and results with a work schedule. Feedback will assist the teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 3 - **Written Research Dissertation:** There will be a written research dissertation weighing 50%. It is a requirement, though; that the research dissertation is based on a well-defined and clear research question/ aim with achievable objective(s) of scholarly significance, and that the dissertation develops a theoretically and methodologically informed and evidence-based answer to that question/aim/objective(s). The word limit for the dissertation is 25,000 words of text, exclusive of appendices, footnotes, tabular material, bibliography or equivalent. The research dissertation must be proofread, edited, and technically of the high standard expected of scholarly outputs. The dissertation must be written in a coherent, formal style and forms a well-ordered whole. The dissertation must observe the conventions and practices of the chosen referencing style (any style can be used, as long as it is used consistently and correctly)

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- The Writing Lab & The OWL at Purdue 2020, *Writing a research paper*, Purdue University, Indiana, viewed 20 January2021, <https://owl.purdue.edu/owl/general_writing/common_writing_assignments/research_papers/index.html>.

References

- American Psychological Association. 2010. Publication manual of the American Psychological Association, 6th Edn, Washington, DC.
- *Style manual for authors, editors and printers* 2002, 6th Edn, Wiley Australia.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI424 Geoinformatics in Earth Science, Tectonic Hazard and Infrastructure Management

Course(s):	Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name:	Geoinformatics in Earth Science, Tectonic Hazard and Infrastructure Management
Subject Code:	GI424
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**15 (**2 hours Lectures + 4 hours Lab Practical)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Geoinformatics in Earth Science, Tectonic Hazard and Infrastructure Management is seen as one of the important field in the research and development sector and plays a vital role in the field of Remote Sensing, GIS, Agricultural Monitoring, Disaster Management, Resource planning and monitoring and other streams related to science, engineering and technology. Geoinformatics itself is a multidisciplinary subject that combines various aspects of science including physics, chemistry, biology, mathematics, etc. into one unit and makes use of technology and science to address and solve real world issues under concept of spatial information technology and geo visualization. It helps establish a connection among people, locations. Under the discipline of Geoinformatics, the course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings Earth Science, Tectonic Hazard and Infrastructure Management. The course will empower student to explore deeply into understanding of Earth Science Especially Geology, and Meteorology, tectonic hazard especially Earth quake and related liquefaction hazard and Infrastructure management in due respect to or during disaster and or geological hazards. The course will empower student to explore deeply into utilization of Geospatial tool to analyze process, investigate and produce data layers and maps to better and further understanding of geological and meteorological processes, the tectonic hazard processes including management of infrastructures in their practical area of interest.

Subject Topics

1. Introduction to Geoinformatics in Earth Science, Tectonic Hazard and Infrastructure Management.
2. Geological and Meteorology Information extraction and generation under Geospatial context.
3. Tectonic Hazard – Earthquake and Liquefaction Geospatial data extraction for Impact monitoring.
4. Infrastructure planning, development and monitoring under tight observation and restriction of occurring Multiple Geo hazards.

Subject Outline

Topic	Content
1. Introduction to Earth Science, Tectonic Hazard and Infrastructure Management	● Concept of Geoinformatics, ● Earth Science Study within Geospatial context, ● Geoinformatics in Tectonic Hazard. ● Infrastructure management.
2. Geological and Meteorology Information extraction and generation under Geospatial context	● Geological analyses, ● Geographical processes and management ● Weather and climate observation.
3. Tectonic Hazard-Earthquake and Liquefaction Geospatial data extraction for Impact monitoring	● Science of Earthquake ● Liquefaction study in relation to geological background ● Geo-hazards

4. Infrastructure planning, development and monitoring under tight observation and restriction of existing Multiple Geo hazards	● Existing Infrastructure monitoring ● Infrastructure development planning under the risk of Geo-hazards

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the principles of Geoinformatics in Earth Science especially, geological and meteorological, Tectonic Hazard and Infrastructure management, manipulation and analysis within Geospatial context.
2. Examining different sources of extracting or retrieving different Earth Science data, Tectonic hazard data, Geological and metrological data including infrastructure data and then to integrate them in Geospatial environment.
3. Understanding the stages of processing of geological and meteorological data through utilizing geospatial tools.
4. Understanding the processes of analysing and monitoring earthquake and Liquefaction possibilities.
5. Explaining the benefits of Geospatial technology for management and monitoring of existing and developing infrastructure in relation to occurring Geo-hazards and or tectonic hazards.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Written Assignment	**(5 %)**
Laboratory Assignment	**(20%)**
Quiz	**(5%)**
Test	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Written Assignment:** There will be one written assignment weighing 5%. The assignment is to be taken away by student and be answered by referring to the lecture notes taught so far and including the internet sources.

Assessment 2 - **Laboratory Assignment** There will be two Laboratories assignment weighing 10% each. The data and instruction will be issued to the students. The students will then use the University provided laptops to execute the assigned task within a given time frame. The students can either use the lab room to do the assignment task or to carry out to their lodging facilities. The practical assignment will be based on practical exercises that are taught so far during class or online via Google class. The practical assignments will be to test the understanding of each student whether they have acquired enough knowledge on that particular topic or module of study.

Assessment 3 - **Quiz:** There will be one quiz weighing 5 %. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Tests:** There will be two tests each weighing 10%. Each test will be given after completion of each designated topics of interest. Tests will provide a brief capture of what is to be given or assigned in the final exam. In each test, student will expect short answer questions including essay type questions with included diagrams or charts; students will also expect numeric problem solving questions to be answered. The feedback from each test will assist teachers to measure learning progress, and to evaluate the effectiveness of this subject.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Tian, B., (2019). *GIS Technology and Applications in Environmental and Earth Sciences,* 1st Edition, CRC Press Tylor & Francis Group, ISBN: 9780367889593.

References

- Departmental Practical Modules.
- ERDAS IMAGINE Tour Guides (2001), Atlanta, Georgia, USA
- Handouts and data provided through Google Classroom.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

BACHELOR OF SURVEYING

First Year First Semester

Code	Subject	Contact Hours	Credit
CD111	Development Practices and Sustainability	6	14
PH111	Physics for Geometicians	6	17
SV111	Fundamentals of Surveying and Survey Computation 1	6	15
MA117	Mathematics 1 S(A+B)	6	21
		24	**67**

First Year Second Semester

AC121	Principles of Accounting	6	21
SV121	Fundamentals of Surveying and Survey Computation 2	6	15
SV122	Fundamentals of Cartography and Computer Assisted Mapping	6	15
GI121	Basics of Remote Sensing, GIS and GNSS	6	15
		24	**66**

Second Year First Semester

Code	Subject	Contact Hours	Credit
MA215	Mathematics 2 S (A+B)	6	21
GI212	Digital Cartography and Map Projection	6	19
SV211	Introduction to Laws and Regulations	6	15
SV212	Cadastral Surveying	6	16
		24	**71**

Second Year Second Semester

MA225	Mathematics 3 S (A+B)	6	21
SV221	Surveying Technologies and Mapping Systems	6	15
SV222	Engineering Surveying 1	6	16
SV223	GNSS for Surveyors	6	16
		24	**68**

Third Year First Semester

Code	Subject	Contact Hours	Credit
SV311	Hydrographic Surveying	6	15
SV312	Statistics for Surveying	6	16
SV313	Geo Spatial Surveying	6	15
SV314	Engineering Surveying II	6	15
		24	**61**

Third Year Second Semester

SV321	Introduction to Geodesy	6	15
SV322	Mine Surveying	6	15
SV323	Adjustments of Survey Measurements	6	15
SV324	Field Work I	6	15
		24	**60**

Fourth Year First Semester

Code	Subject	Contact Hours	Credit
SV411	Sub Division Design Principles	6	15
SV412	Survey Practice I	6	18
SV413	Surveying Project I	6	15
SV414	Geodesy I	6	16
		24	**64**

Fourth Year Second Semester

SV421	Field work II	6	15
SV422	Survey Practice II	6	18
SV423	Surveying Project II	6	15
SV424	Geodesy	6	16

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Graduate Statement (GS)

The graduates will have in-depth knowledge about all aspects of surveying techniques and relevant field of Geomatics. They will have skills to state-of-the Art hardware and software in the field of GNSS, Automated Surveying and Mapping systems, photogrammetry/Remote Sensing for innovative research and development of entrepreneurship in cadastral, engineering and hydrographic survey.

Course Learning Outcomes (CLOs)

On completion of the course the student will:

CLO1	Possess in-depth knowledge and skills in the principles of spatial measurements and analytical skills at a professional level.
CLO2	Under take field survey measurements, synergize and analyses and present the information to professional standards.
CLO3	Understand the different factors affecting the land use, synergize and analyze information and apply professional service to resolve them.
CLO4	Participate operatively in the practice and development of the surveying profession through institutional arrangements to attain or award professional competency by the Surveyors Board.
CLO5	Work in a multidisciplinary team to provide professional services to achieve the desired goals.
CLO6	Perform duties as a good corporate citizen consistent with the prevailing corporate governance guidelines and Professional Code of Ethics.
CLO7	Engage in lifelong research and development including CPD to embrace the emerging changes to maintain entrepreneurship and professional competitive edge.
CLO8	Understand, synergize and analyse information on potential impacts of globalization in the economic environment and societal contexts and assist to mitigate/solve them.

SUBJECT DETAILS: SURVEYING
FIRST YEAR
SV111 Fundamentals of Surveying and Computation 1

Course(s):	Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name:	Fundamental of Surveying and Computation 1
Subject Code:	SV111
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15 **(**2 lectures+2 Tutorials+2 Practicals)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

The subject provides students the opportunity to study the fundmental concept of surveying, suveying field techniques and insrumentation, surveying computaions using programmable sciientific calculatorst and producing simple survey plans/maps using feild survey data thus deminstrating the esentail relationships of surveying from whole to part theory to achieve the required survey accuaries and the products.

Subject Topics

1. Surveying instruments, their types, care, adjustments and use. Surveying theory and techniques
2. Recording of observations. Systematic errors in survey observations. Survey computations and field exercises.
3. Traversing; open and close traverses, calculation and distribution of angular errors, calculation and distribution of linear miscloses.
4. Programmable scientific calculator; stacks storage registers; conversion from polar to rectangular and vice versa
5. Calculator programming; conversion from polar to rectangular, coordinates and area from open and closed traverses.
6. Conversion from polar to rectangular, coordinates and area from open and closed traverses.

Subject Outline

Topic	Content
1. Surveying instruments, their types, care, adjustments and use. Surveying theory and techniques	● Defining position in the form of coordinates. Coordinate calculation using rectangular to polar and polar to rectangular conversion. Calculate traverse coordinates from measured angles and distance. Calculate coordinates of points by resection.
2. Recording of observations. Systematic errors in survey observations. Survey computations and field exercises.	● Calculate the bearing and distance of a missing line. Calculate the traverse misclose. Calculate the traverse precision Determine the allowable misclosure of traverse.
3. Traversing; open and close traverses, calculation and distribution of angular errors, calculation and distribution of linear miscloses.	● Principle of working from Whole to Part. This surveying principle involves laying down an overall system of stations whose positions are fixed to a fairly high degree of accuracy as control, and then the survey of details between the control points may be added on the frame by less elaborate methods. From Control surveying to plane surveying.
4. Programmable scientific calculator; stacks storage registers; conversion from polar to rectangular and visa versa	● Mathematical model to remove systematic errors, Calibrate the observing equipment and to quantify the errors, Electronic calibration on a Total Station. Observational procedures to remove the effect of errors (take mean of face left and face right reading. Keep length of back sight and foresight the same in order to eliminate errors.
5. Calculator programming; conversion from polar to rectangular, coordinates and area from open and closed traverses.	● To determine the allowable misclose. Compute and distribute angular and linear misclose within the traverse circuit. Determine the adjusted bearing and distance within the traverse.

6. Conversion from polar to rectangular, coordinates and area from open and closed traverses.	● To generate a wide range of drawings and views for use in the design and setting out procedures. Adding layers of information such as location of services and boundaries of properties and so on, the database can form a GIS which can be used by wide range of disciplines.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Measure and compute sides and angles of an irregular polygon and coordinate of unknown points;
2. Carry out simple survey computation using programmable scientific calculators.
3. Define basic principles which are common to all branches of survey;
4. Locate and remove systematic errors in survey measurements;
5. Compute and adjust angular, linear and proportional misclose;
6. Produce simple survey palns/maps from survey data.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 20% towards the final grade for the subject

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Musket, J., Site Surveying, BSP, Blackwell Science Ltd., 2Edition, 1995

References
Whyte, W., Revision Notes on Plain Surveying, Newnes-Butterworths, London, 1971.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV121 Fundamental of Surveying and Survey Computation 2

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Fundamentals of Surveying and Survey Computation 2
Subject Code: SV121
Duration: 13 teaching weeks
Contact Hours: 6 hours per week; (2 Lectures +1 Tutorial +3 Practicals)
Credit Points: 15
Delivery Mode On campus
Prerequisites: SV111
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides student the opprtunity to study and to further enhance their knowledge and skills in the theory and basic field surveyings techniques of engineering and topographical surveying and mapping and also to acquire relevant basic computaional knowledge in enginering surveys and designs.

Subject Topics

1. Surveying: Types of levels, their use and adjustments.
2. Recording and reduction of height of collimation and rise and fall methods
3. Contouring, direct and indirect methods of contouring; interpolation of contours
4. Compute Total CREDIT coordinates from open and closed traverses, area by double longitude and co-ordinate methods and carry out all the necessary adjustment computation
5. Calculator programming; conversion from polar to rectangular, coordinates and area from open and closed traverses
6. Computations of stadia/tacheometric surveys, traversing & topographical surveys.

Subject Outline

Topic	Content
1. Surveying: Types of levels, their use and adjustments.	● Three types of level available – automatic, digital and tilting levels. All levels incorporate similar telescopes and to avoid errors in staff reading, it is important to remove parallax. Levels must be check for collimation errors regularly.
2. Recording and reduction of height of collimation and rise and fall methods	● Two methods of calculating reduce level. 1. Rise and Fall method. 2. Height of Plane of Collimation. Rise and fall method should be used when establishing heights of new TBM and Height of plane of collimation (HPC) method should be used for mapping and setting out.
3. Contouring, direct and indirect methods of contouring; interpolation of contours	● Large contour intervals are used on small scale plans and hilly areas and small contour intervals are used on large scale and flat area. Sufficient number of spot heights must be recorded so the ground surface can be accurately represented. Automatic interpolation can be done by software and manual can be done graphically
4. Compute Total CREDIT coordinates from open and closed traverses, area by double	● Area calculation by coordinate's method. Missing line computation, compute two missing lines and two missing bearings. Types, definition and notation of curves. Types of curve design.
5. Calculator programming; conversion from polar to rectangular, coordinates and area from open and closed traverses	● Students will be given an HP 32 programmable calculator and given the task to input surveying program. Survey computation like calculating missing lines, traverse computation, leveling computation will be tested out on the calculator.

6. Computations of stadia/tacheometric surveys, traversing & topographical surveys.	● Perform appropriate field procedure, proper booking of data, computation and production of topographical and detail survey plan.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Describe how Levelling instrument works and field procedures used for determining heights;
2. Perform necessary calculations and checks for determining heights by levelling;
3. Test the adjustment of tilting and automatic levels (Two Peg Test);
4. Understand the theory and applications of vertical and circular curves.;
5. Performing Survey computations using Programmable Calculator and Surveying Software.

Assessment Tasks and Weighting

The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.
To obtain a pass grade in this Subject 50% overall must be achieved. There is a final examination in this subject.

Students must also refer to the Subject Assessment Details.

Tests	**(20%)**
Assignments	**(30%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2- **Practical Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 30% towards the final grade for the subject

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Musket, J., Site Surveying, BSP, Blackwell Science Ltd., 2Edition, 1995

References

- Whyte, W., Revision Notes on Plain Surveying Newnes-Butterworths, London, 1971.
- PNG Department of Works, Standard Survey Instructions.
- Department Modules and Lecture Notes

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV122 Fundamentals of Cartography and Computer Assisted Mapping

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Fundamentals of Cartography and Computer Assisted Mapping
Subject Code: SV122
Duration: 13 teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 (2 Lectures+ 1 Tutorial+3 Practicals)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: SV121
Subject Coordinator: TBA

Synopsis

The subject provides students the opportunit to study the basic principles of Computer Assisted Drafting and to acquire fundemental skills to plot engineering and cadatral plans using digital feild survey data inculding revelant baisc concepts such as map projection, geomtry construction and manipulation, electronic data trasfer, creating plot file and the prevailing mapping systems used in Papua New Guines

Subject Topics

1. Overview of CAD/CAM and GIS systems hardware & software components
2. Basic drawing/graphic elements, text, edit and element manipulation functions
3. Introduction to map projection
4. Preparing the system for drawing; Creating a drawing on the system
5. Use of reference manual and context help; PNG survey plan drafting standards and plan drawing
6. Cadastral mapping system of PNG; digital topographic mapping; thematic mapping
7. Electronic publishing; Map and plan printing technologies

Subject Outline

Topic	Content
1. Overview of CAD/CAM and GIS systems hardware & software components	● Acquire a basic understanding of feature-based parametric, assembly and geometric and solid modelling concepts that form the core of CAD/CAM systems.
2. Basic drawing/graphic elements, text, edit and element manipulation functions	● Basic Drawing Elements, Edit and Utility Commands, create layers, Naming and Modifying Layers, assigning attributes, Lock, unlocking and freezing of layers. Turning on and off layers, Exporting and importing layer state.
3. Introduction to map projection	● Basic concepts and equations. Map scales. Deformation length, size and angles. Division of projections. The transition from vertical to horizontal and oblique projections. Transformation of coordinates between adjacent systems.
4. Preparing the system for drawing; Creating a drawing on the system	● Use of materials manual. Survey Data Entering Systems and Data Manipulation
5. Use of reference manual and context help; PNG survey plan drafting standards and plan drawing	● Creating Tittle and or Scaling of Block according to PNG Survey Standards.
6. Cadastral mapping system of PNG; digital topographic mapping; thematic mapping	● Converting of Photographs to ESCI file format and Aerial Photography or LIDAR Images.
7. Electronic publishing; Map and plan printing technologies	● Plot Settings, Orientation and page setup, Plot styles and Port settings, Plot scale, paper sizes and previewing.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:
1. Demonstrate basic concepts of the AutoCAD software;
2. Apply basic concepts to develop construction (drawing) techniques;
3. Ability to manipulate drawings through editing and plotting techniques;
4. Understand geometric construction;
5. Produce template drawings.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(30%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Practical Assignment:** Individual and team based report outlining the topic given. Contributes 20% towards the final grade for the subject

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Ahn, J. K. (1984). Automatic Name Placement System. Publication No. IPL-TR-063, Image Processing Laboratory, Rensselaer Polytechnic Institute, Troy, NY.

References
- De Blij, H.J. and Muller, P.O.,Human Geography: culture, society and space , 8th Ed., Wiley, 2006.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SECOND YEAR
MA215: MATHEMATICS FOR SURVEYING AND GEOGRAPHIC INFORMATION SCIENCE

Course(s):	Second Year Surveying and GIS (NQF Level 8)
Subject Name:	Mathematics for Surveying and Geographic Information Science
Subject Code:	MA215
Duration:	13 teaching weeks
Contact Hours:	6 hours per week
Credit Points:	13
Delivery Mode:	On campus
Prerequisites:	MA117
Co-requisites:	Nil
Subject Coordinator:	Mathematics Teaching Staff

Synopsis

This subject combines the mathematics taught in first and second semester of year two (MA 251 & MA 252) in the previous syllabus. As mathematics being the universal tool in solving and finding solutions to problems in any discipline of knowledge, the subject aims to equip students doing BTSR & BGIS with the necessary mathematical skills and techniques required to solve problems related to their field of study. The subject introduces Differentiation, beginning with basic techniques of differentiation to partial differentiation, implicit differentiation and total differentiation and differentiation application in calculating curvatures and radius of curvatures at any given point, finding equation of tangents & normal. This is followed by sketching of basic algebraic and trigonometric functions, application of integration in calculating areas under any given curve, area between two or more curves, and use of various /appropriate formulas to solve problems involving financial mathematics involving percentage variations, compound interest, and annuities.

Subject Topics

1. Differentiation
2. Graph Sketching
3. Integration
4. Financial Mathematics

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Find derivatives and integrals of standard functions,
2. Solve problems involving areas, tangents normalize and volumes
3. Estimate errors of functions involving two variables
4. Find partial derivatives and the use of partial derivatives in error estimation and rate measure
5. Solve problems involving curvature and radius of curvature
6. Use numerical techniques and integral methods to calculate areas under the curve
7. Calculate percent variation, compound variation and annuities.

Assessment Tasks and Weightings

Students must attain at least 50% overall in the subject to pass the subject. Formative assessments (spread throughout the semester) will contribute 50% and a summative assessment (final 3 hours written examination) will contribute the other 50% to the overall assessments.

Students must also refer to the Subject Assessment Details.

Formative assessments	**(50 %)**
Final Examination	**(50%)**

Assessment 1 -	**Formative assessments:** Take-Home Tests, Tutorials, and Assignments & Closed book Tests.
Assessment 5	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Stroud K.A., Engineering Mathematics: Programs and problems, 4th Ed (Macmillan, 1995).

References

- Howard Anton, Calculus with Analytic Geometry, 3rd Ed (1988)

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

GI 212: DIGITAL CARTOGRAPHY AND MAP PROJECTIONS

Course(s): Bachelor of Geographic Information Science (BGISc) (NQF Level 7)
Subject Name: Digital Cartography and Map Projections
Subject Code: GI 212
Duration: 13 teaching weeks
Contact Hours: 6 hours per week
Credit Points: 19 **(**4 lectures, + 2 Practicals)
Delivery Mode: On campus
Prerequisites: SV122
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject will educate and train students to examine, distinguish and recognize the field of Digital Cartography as a modern discipline of map design, compilation and publication and its development alongside the advancements of computer technology. It looks at Cartography as a discipline that has transitioned from traditional practices of map- making and its complex set of conventions and techniques, through to the advancement of technology, which uses comprehensive computer application for performing a wide range of functions and analysis on geospatial data.

Subject Topics

1. Cartographic Communication Vs Visualisation & Semiology and cognitive issues in cartography
2. Map Projections
3. Spatial arrangement of geographic phenomena, identifying levels of cartographic measurements
4. Thematic mapping and geo-spatial data classification, statistical and graphical foundation
5. Theory of colour and colour schemes
6. Cartographic animation and 3D cartography

Subject Outline

Topic	Content
1. Cartographic Communication Vs Visualization & Semiology and Cognitive issues in Cartography.	Perception and design with cartographic abstraction, map execution and dissemination. Identifying data models for Digital Cartographic information, Geographical Information Systems.
2. Map Projections	Properties of map projections, classification and choice of map projections. Identification and calculation of projection parameters. Determination of UTM zones
3. Spatial arrangement of geographic phenomena, identifying levels of cartographic measurements.	Scale, reference and coordinate systems, map digitizing and digital databases. Geographic and cartographic database concepts. Sources of data, remote sensing and data processing.
4. Thematic mapping and geo-spatial data classification, statistical and graphical foundation.	Choropleth, Proportional symbolising, Cartogram, Isarithimic or Isoline, Dot, Flow and Dasymetric thematic Cartography. Multivariate Mapping and Modelling.
5. Theory of color and color schemes	Colour Theory and Models, Colour Pattern Creation and Specification, Colour and Pattern Use. Typography and Lettering the Map.
6. Cartographic animation and 3D cartography	Animation, Navigation Systems, Simulation, Interactive Cartography and Map as an Interface.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

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1. Conversantly discuss the theoretical and cognitive issues of thematic cartography.
2. Clearly articulate how the principles of the spatial arrangement of geographic phenomena, levels of measurement, visual variables that are applied to effectively symbolize geographic phenomena on thematic maps
3. Accurately describe and apply the Statistical and graphical foundations of thematic mapping, and apply to Data standardization and Data classification in thematic mapping.
4. Understand and apply the techniques of Thematic Mapping which include; choropleth mapping, dasymetric mapping, Isarithmic mapping, proportional mapping, dot mapping, multivariate mapping, cartograms and flow maps.
5. Be familiar with the principles and applications of spatial data exploration, animation and electronic atlases.
6. Be familiar with and discern between different map projections systems and their application. Focusing on coordinate systems used in geodesy and its relationship to scale.

Assessment Tasks and Weightings

To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Assignments	**(20%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 -	**Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.
Assessment 3 -	**Assignments:** There will be 2 assignments contributing 20% towards the final grade for the subject
Assessment 4 -	**Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.
Assessment 5	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Arthur, H.R., Joel, L.M., Phillip, C.M., A, J.K., and Stephen, C.G., (1995) Elements of Cartography, 6thEdn., Wiley & Sons Inc, Canada. ISBN: 9-814-12638-1

References

- Gregory, I. N. (2003), A place in history: a guide to using GIS in historical research. Oxford: Oxbow Books.
- Longley, P. A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W., John Wiley and Sons Ltd, Chichester, Geographic Information Systems and Science, 4th Ed., 2015
- Spencer, J., Frizzelle, B. G., Page, P. H. and Vogler, J. B. (2003), Global Positioning System: a field guide for the social sciences. London: Blackwell Publishers.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV211 INTRODUCTION TO LAND LAWS AND REGULATIONS

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Introduction to Land Laws and Regulations
Subject Code: SV211
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 (2 lectures + 2 Tutorials + 2 Practicals)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The students should familiarize themselves and understand the processes of allocation, documentation of ownership and administration of the state leases as set out in the Papua New Guinea Land Act. They should also understand the legal frame work by which the State may acquire customary land for public purposes, reservation, wildlife and conservation, economic and resource development, business and private purposes.

Subject Topics

1. Process for allocation, documentation of ownership and administration of the state leases
2. Procedure involved in the registering of Customary Land and issuance of Title
3. Rights of ownership over Freehold, State and Customary land. Terms and conditions of lease.
4. Definition and nature of customary land tenure.
5. Process of alienating customary land.
6. Type of easements and their creation.

Subject Outline

Topic	Content
1. Processes of allocation, documentation of ownership and administration of the state leases	● State land is held on behalf of the people for development purpose. Some state lands are made available for agricultural projects, school, hospitals roads etc. But some are granted individually as state leases for residential, commercial and industrial
2. Importance of registering of Customary Land and issuance of Title	● The primary purpose of registering an ILG under the Land Reforms on customary land tenure system is for customary land registration. Other purpose is, ILGs are used in the resource sectors like mining, petroleum, agriculture, forestry etc., to pay landowner benefits
3. Rights of ownership over Freehold, State and Customary land. Terms and conditions of lease	● Freehold is a privately owned property whereas customary landowners have the right of ownership over their customary land. State land is owned by the state and leases it out for business, special purpose, mission and urban development lease.
4. Definition and nature of customary land tenure.	● Land which is owned and control by indigenous people according to their customs.
5. Process of alienating customary land.	● Government and customary land owners should always enter in to an agreement in good faith to acquire or lease customary land. The agreement should be voluntary.
6. Type of easements and their creation.	

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Recognize different modes of acquisition of customary land by government
2. Describe the two basic categories of land in PNG and the nature of customary land tenure.
3. Identify land to lease and the process for obtaining suitable lease
4. Recognize ownership interest in a property and the right to leave share of the property
5. Identify whether easements benefits or burdens the property and its type and nature
6. Illustrate how easements can be created and how it is distinguished from license

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(50%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 4 Tests contributing 50% towards the final grade for the subject.

Assessment 2 - **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Amankwah, H.A., Mugambwa, J.T. and Moroa,G, 2009, Land Law in Papua New Guinea, , University of Papua New Guinea Press. ISBN 9980-939-51-6.

References

- Sack P.G. (ed.), 1974, Problem of Choice: Land in New Guinea's Future. Canberra: ANU Press, Chaps. 9 and 12.
- Trebilcock M. and Knetsh J., 1981, Land Policy and Economic Development in Papua New Guinea'. Melanesian Law Journal Vo1.9

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV212 CADASTRAL SURVEYING

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Cadastral Surveying
Subject Code: SV212
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 (3 lectures + 3 Practicals)
Delivery Mode On campus
Prerequisites: SV111
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject train and mould students that they should always keep in mind the interest of Papua New Guinea in all his operations, shall disclose all doubts, discrepancies and difficulties to the Supervising Surveyor. Before commencing any survey, he /she shall obtain full information on previous surveys, acquisitions and orders made under the Land Tenure Conversion Act as is applicable to the requirements of the particular survey.

Subject Topics

1. Duties and responsibility of a surveyor.
2. Survey marks used in different method of survey.
3. Determination of datum generally by direct connection to existing PSMs, or standard traverses, the bearings of which have a true value of Grid North or Astronomical means.
4. Types and classes of survey.
5. Procedures followed and problem encountered while surveying Customary Land
6. Precision of different Classes and Methods of Survey.

Subject Outline

Topic	Content
1. Duties and responsibility of a surveyor.	● Surveyors shall ensure that they are familiar with the Surveyors Act, the Survey Regulations and the Survey Coordination as in force from time to time.
2. Survey marks used in different method of survey.	● Cement pegs and galvanized pipes shall be used as boundary pegs. Iron pins and reference trees shall be used for referencing of boundary marks. Brass plaque and copper pipe for Permanent survey marks.
3. Determination of datum generally by direct connection to existing PSMs, or standard traverses, or by Astronomical means.	● Surveyor General accept methods, which conform to good survey practice and will give the accuracy required for the particular class of survey. Surveyor General may grant an exemption from this requirement on the grounds of isolation, unimportance or size of the survey relative to the cost of obtaining such a true value.
4. Types and Classes of Survey	● Two main types of survey: 1 Geodetic and Plain Surveying. Urban class one, two and three and Rural Class 1, 2 and 3.
5. Procedures followed and problem encountered while surveying Customary Land	● In this particular part of survey where you deal with landowners, certain directions are advice rather than directions and are preceded by the word; “Advice”. Surveyors are instructed to be aware if their survey does not agree with customary title then no registered title can issue.
6. Precision of different Classes and Methods of Survey	● The angular and linear measurements made on each survey shall be checked by the calculation of the difference in latitude and departure of each line following adjustment of bearing miscloses. The error of closure shall be calculated relative to the length of the surround where the survey closes on itself

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Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Recognize and familiar with the Surveyors Act, the Survey Regulations and the Survey Coordination as in force from time to time
2. Conform with good survey practice that will give the accuracy required for the particular class of survey.
3. Identify the two main types of survey: 1 Geodetic and 2. Plain Surveying. Urban class one, two and three and Rural Class 1, 2 and 3
4. Recognize that when you deal with landowners, certain directions are advice rather than directions and are preceded by the word; "Advice".
5. Operate on different types of total station and process data on various surveying software
6. Demonstrate the angular and linear measurements made on each survey which shall be checked calculation and finally followed by adjustment of bearing misclose.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** There will be Subdivision practical assignments weighing 20%

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Independent State of Papua New Guinea Survey Direction 1990.

References

- Bannister, A., and Raymond, S. Surveying, Pitman, latest edition, London.
- Shepherd, F.A., Surveying Problems and Solutions, Arnold, latest edition, London
- Uren, J., & Price, W. F. 2010, Surveying for engineers. Macmillan International Higher Education

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

MA225: MATHEMATICS FOR SECOND YEAR SURVEYING & GEOGRAPHIC INFORMATION SCIENCE

Course(s):	Second Year Surveying and GIS (NQF Level 7)
Subject Name:	Mathematics for second year surveying & geographic information science
Subject Code:	MA225
Duration:	13 teaching weeks
Contact Hours:	6 hours per week
Credit Points:	21
Delivery Mode:	On campus
Prerequisites:	MA215
Co-requisites:	Nil
Subject Coordinator:	Mathematics Teaching Staff

Synopsis

This subject, MA225 is the revised version of the two old merged syllabi; MA351 and MA352, Third Year Math for Surveying Students. The subject is aligned to teach the Mathematical skills that are essential for solving geometrical problems. The earth is comprised of shapes and dimensions and at a global perspective; the earth itself is spherical, a single shape of its own. Identifying and studying of shapes and their properties, and positioning are the integral part of the Surveying and GIS degree program. Therefore, the kind of Mathematics taught at the third year level is considered handy tools useful for the students when it comes to solving practical application problems.

Subject Topics

1. Three Dimensional Geometry
2. Quadric Surfaces
3. Vectors
4. Matrix
5. Coordinate Systems

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Do 3D sketch of plain, solids & surfaces, determine line passing through two points and calculating directional cosines and numbers, determine a plane passing through three points and determine surfaces corresponding to given equations.

2. Familiar with the general equation of a quadric surface and from this derive the six different, non-degenerate types of quadric surfaces. Know the techniques for graphing quadric surfaces. The quadric Surfaces include; Ellipsoid, Elliptic Cone, Elliptic Paraboloid, Hyperboloid of 1- sheet, Hyperboloid of 2 - sheets and Hyperbolic Paraboloid.

3. Understand what a vector is and their features and perform vector algebra. Know the geometrical aspects of vector and use vector to solve geometric problems.

4. Understand what a matrix is and its features and perform matrix algebra. Find inverses and determinants of square matrices. Solve systems of simultaneous equations and use matrix to solve geometric problems.

5. Identify the different types of coordinate systems and convert from one form to the other and vice versa. The coordinate systems especially including; Cartesian, Polar, Cylindrical and Spherical Coordinate Systems. At the end of this topic students will be able to correlate between these coordinates systems and other types of recommended coordinate systems for surveyors such as geographical coordinates and solve practical problems on the earth's surface.

Assessment Tasks and Weightings

The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%. To obtain a pass grade in this subject, 50% overall must be achieved and at least 25% achieved in the final examination.

Students must also refer to the Subject Assessment Details.

Formative Assessments	**(50 %)**
Final Examination	**(50%)**

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Assessment 1 - **Formative assessments:** Quiz, Assignments, Projects and Tests weighs 50%

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Stroud K.A., Engineering Mathematics: Programs and problems, 4th ed (Macmillan, 1995).

References

- Oakland, J. S. (2008). Statistical Process Control. Elsevier, Oxford, UK.
- Lawless H. T. and Heymann H. (2010). Sensory Evaluation of Foods, 2nd Edition, Springer, New York.
- Lawless H. T. and Heymann H. (1999). Sensory Evaluation of Foods. Springer, New York.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV221 SURVEYING TECHNOLOGIES AND MAPPING SYSTEM

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Surveying Technologies and Mapping Systems
Subject Code: SV221
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The Surveying Technology and Mapping Systems subject are fundamental skills to be attainment for field and office oriented applications in surveying profession. The conventional field methods of the profession have been replaced by latest State of the Art Technologies and systems together with the automation of mapping analytical and processing software developed to replace manual freehand drafting. The principle concepts of Survey are retained however the enhancement of the productivity is being assisted by this Technologies and system available. This course builds on the fundamentals of Arts and Science of Surveying an d gradually moves towards advanced techniques and their applications in real world. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings surveying. Ultimately, the course will empower students to delve more deeply into advanced issues in surveying to work with post processing tools for their particular area of interest.

Subject Topics

1. Conceptual brief and introduction to Automated Surveying and Mapping system
2. Various advance data capturing Technology and Field tools accessories
3. Conceptual framework on Photogrammetry and Ariel Images
4. Advance data post processing systems, analytical techniques and e-computations.
5. Standard Mapping Schedules according to Global standards and plotting layouts
6. Data exchange, transfer to end-user's desirable formats and presentation.

Subject Outline

Topic	Content
1.Introduction to Automated Surveying concepts and Mapping systems	• Identifying various types of Surveying technologies and Mapping Systems used globally. • Selective of Technologies and Systems available to perform Survey Projects and tasks • Compare and contrast of the uses of these techniques and systems suitable for Survey practices
2.Various advance data capturing Technology and Field tools for recording systems	• Introductory to Total Stations (various brands) • Introductory to Real Time Kinematic GPS systems (various brands) • Introductory to Aerial Survey (UAV) systems (various brands) • Field Mobile and Office Units for data collections
3.Advance data post processing systems and analytical techniques	• Advance Survey Processing Systems • Field, Tools, Site • Imaging and Post Processing • 3DMC Construction and Office
4.Standard Mapping Schedules and plotting layouts	• Survey Directions 1990 Schedules 13, 21 and 24 • DoW - Roads and Bridges standards • DLPP – Physical planning Standards

5.Data exchanging and end-users desirable formats	● Identify the common sharing of data in multi-professional end-users.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the various Surveying technologies available and their used specific used in professional field data acquisition.
2. Interpret and analyse raw data using surveying analytical software packages and post processing.
3. Examine survey raw data in Surveying platform and assessment of errors to derive precise mapping plots.
4. Apply mathematical surveying computations in adjustments of Geodetic Network, Engineering Controls and other Surveying applied measurements
5. Identifying the Surveying and Mapping Standards in the professional industry enhance effective productivity.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests **(20%)**
Assignments **(30%)**
Final Examination **(50%)**

Assessment 1 - **Tests:** There will be 1 Test contributing 20% towards the final grade for the subject.

Assessment 2 - **Laboratory and field work:** The Laboratory and field work assignment will contribute 30% towards the final grade for the subject.

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Schofield,W and Breach, M, (2007), Engineering Surveying, 6th Edition, ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References
- Construction Surveying Field Manual (1985)
- Topcon Positioning Partners User Reference Manual (2016)
- Sokkia Set 500 Series User Manual (2001)

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV222 ENGINEERING SURVEYING I

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Engineering Surveying I
Subject Code: SV222
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 16 (3 lectures + 3 Practicals)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The Engineering Surveying Subject is design to guide the students support to conduct any Engineering projects. In addition to arts of Science measurements and mathematical considerations, the subject offers a comprehensive of engineering problems which are typically face out in the real industry of Construction and Engineering. This fundamental concept can be used for the purpose of knowledge based hub or hands on training in real world. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings surveying. Ultimately, the course will empower students to delve more deeply into advanced issues in surveying to work in particular.

Subject Topics

1. Engineering Surveying objectives
2. Road Engineering Surveying
3. Alignment and Curves Designs
4. Earthwork and quantity measurements
5. Site Engineering Surveying and advance computations and setting outs

Subject Outline

Topic	Content
1. Engineering Surveying objectives	• Introduction to Surveys and fundamental concepts applicable to Engineering projects
1. Road, Alignments and Profile Engineering Surveying	• Site reconnaissance surveys and planning stages • Preliminary Surveys • Final Survey locations • Construction layout Surveys
2. Alignment and Curves Designs	• Simple horizontal curves • Obstacles to curve locations • Compound and reversal curves • Transitional spirals • Vertical Curves
3. Earthwork and quantity measurements	•Planning of Earthwork operations •Advance Surface Area computations •Earth and rock excavation and backfilling
4. Site Engineering Surveying and advance computations and setting outs	• Locations and site topographic Surveying techniques • Profiles and Alignments Surveys • Site layouts • Building layouts • Utilities layouts

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Understand and explain the fundamental objective of Engineering Surveying and its diversity in broader context of engineering related projects.
2. Apply the standards of field operations in engineering projects whether in Urban or Rural setting together with selective methods.
3. Compute the advance mathematical problem solving in Site Engineering to evaluate and support decision making to coordinating Project Managers.
4. Evaluate and assist Engineering Designs specifically tasked to Roads, Bridges, Subdivisions, Padding or Earthworks quantifications
5. Prepare Surveying and Mapping services readily to Managers for the progressive work of the Engineering projects.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20%)**
Laboratory and field work	**(30%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 1 Test contributing 20% towards the final grade for the subject.

Assessment 2 - **Laboratory and field work (if any)** The Laboratory and field work will contribute 30% towards the final grade for the subject.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Schofield,W and Breach, M, (2007), *Engineering Surveying*, 6th Edition,ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References

- Construction Surveying Field Manual (1985)
- Topcon Positioning Partners User Reference Manual (2016)
- Sokkia Set 500 Series User Manual (2001)

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV223 GNSS Surveyors

Course(s):	Bachelor of Surveying (NQF Level 7)
Subject Name:	GNSS for Surveyors
Subject Code:	SV223
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15 (3 Lectures + 3 Practicals)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	SV 222, GI 121
Subject Coordinator:	TBA

Synopsis

The subject provides students with advance knowledge and practical aspects of high precision GNSS/GPS receivers and techniques applicable to many different positioning applications together with associated software. The output coordinates are in various surveying, GIS, Civil construction, land use planning and related research platforms. Students learn to accept and appreciate from different methodologies of GNSS data capture and are encouraged to advance their knowledge and understanding to improving methodologies of data capture in order to meet various standard level of requirements.

Appreciation of satellite systems/constellations besides the dominant GPS constellation is accepted and allows incorporation of the other PNT systems to provide interoperability of satellite systems on the latest emerging receivers and software technology.

Furthermore, the students are able to understand the main geodetic systems to relatively integrate GPS/GNSS and transform from the universal system to PNG's National Geodetic Datum to standardise surveying and mapping on one common national system. The height component of GNSS/GPS on the ellipsoid surface is also given prominence to practically demonstrate the reduction to the Gravity Geoid Models EGM96, GEM 2008 and the relationships to the mean sea level (MSL).

Subject Topics

1. Plan and document the process of executing an effective GNSS field and office operations
2. GNSS/GPS equipment, categories and limitations and software processing packages
3. Execution of GNSS/GPS field data capture using various observation techniques.
4. Generate relative baseline vectors between base stations and rover points to produce network solutions.
5. GNSS Solutions/Topcon Utility and other appropriate open source software to process raw GNSS/GPS data
6. Universal Coordinate Systems, Geodetic Datums and transformation from system to system from GNSS/GPS coordinates output.

Subject Outline

Topic	Content
1. Plan and document the process of executing an effective GNSS field and office operations	● Office planning, search of old existing survey data, survey sketches, survey marks, topographic and photographic map sources, field reconnaissance, station marking and clearing for GNSS/GPS observations.
2. GNSS/GPS equipment, categories and limitations and data processing software	● Categories of GNSS/GPS receivers, Code and Carrier, L1 L1C, L2, L2C receivers, GPS, GLONASS, BeiDou, Galileo signal interoperability, SBAS signals and Limitations

3. Execute GNSS/GPS field data capture, Observation techniques.	● Static and Kinematic Observations, post processing and RTK methodology of data capture, Geoid, MSL connections integrating with precise levelling on the topographic surface.
4. Generating relative baseline vectors between base stations and rover points to define network solutions.	● Observation scheduling: Common observation time, epoch interval and elevation masks, antenna calibration, for network integration and connections on one Common Geodetic System, standalone positioning for output on ITRF systems
5. GNSS Solutions/Topcon Utility and other appropriate open source software to process raw GNSS/GPS data	● GNSS Solutions and Topcon Utility software, GEOCALC, EGM2008 Calculator
6. Coordinate and Datum transformation from system to system and GNSS/GPS coordinate output	● From WGS84 on Geographic, Grid and ECEF XYZ coordinate systems and transformation from system to system. Ellipsoid to Plane (Physical) Surface transformation on Civil projects and as well for WGS84 and ITRF Datum to Local Geodetic Datums PNG94 and AGD66

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Understand the importance of proper planning and the economics of resources on time, costs and data quality against natural phenomenon on topography, the terrain and weather conditions and the human resource and savvy on high precision GNSS/GPS project implementations.
2. Comprehend and be able to differentiate between different GNSS/GPS receivers, capabilities and limitations on certain project required level of standards required.
3. Experience various GNSS/GPS techniques and methodologies of data capture to that suit the required level of expected outcome
4. Appreciate and understand the importance of Network connectivity relative to high precision coordinate integration on civil projects and on major national geodetic coordinate network appropriate to level of precision.
5. Have confidence on the use of GNSS/GPS data processing software for output to various formats in Surveying, GIS and other related fields.
6. Conceptualise the bigger picture of the Subject topic to effectively communicate with other related allied professions on matters relating to applications and policy issues of GPS/GNSS for GIS and many other Environmental and Earth related science studies on common coordinate and geodetic systems/datums.

Assessment Tasks and Weightings

The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(10 %)**
Assignments	**(15%)**
Quiz	**(25%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 1 Test contributing 10.% towards the final grade for the subject.

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Assessment 2 -	**Assignment:** There will be one written assignment weighing 15%. The assignment is compilation of field records of a GNSS observations data and differential levelling data collected as group activity but individual student is required to produce individual satellite data processing and output analyses of the final Ellipsoid and Plane surface coordinates together with Geoid heights with comparison to the levelling based on MSL
Assessment 3 -	**Quizzes:** There will be 3 quizzes weighing 15%. These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures.
Assessment 4	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Jan Van Sickle: GPS for Land Surveyors, ISBN 9781466583108 Published June 1, 2015 by CRC Press.
- Alfred Leick, L Rapaport, D. Tatarnikov: GPS Satellite Surveying 4th Edition. First Published March 2, 2015 John Wiley & Sons, Inc
- Subject handouts, tutorial exercises, notes and power point presentations will be posted to the Google Classroom.

References
- GNSS Solutions Reference Manual (Software)
- Magnet Office Tools- GNSS Post Processing software.
- HiPer Sr Operations Manual Topcon Recovers- Receiver operations
- Jan Van Sickle: GEOG 862: GPS and GNSS for Geospatial Professionals-Notes on current and future capabilities of GPS and emerging Global Navigation Satellite Systems.
- Lecture Notes and power point presentations on the subject

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

THIRD YEAR
SV311 HYDROGRAPHY SURVEY

Course(s):	Bachelor of Surveying (NQF Level 7)
Subject Name:	Hydrography Survey
Subject Code:	SV311
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15
Delivery Mode	On campus
Prerequisites:	SV221, SV222, SV223
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This course focuses on Hydrography, navigation, and hydrographic survey. Students develop an appreciation of the concepts of coordinates, measurement, underwater acoustics, positioning, sounding, and different sources of hydrographic data and information. Students examine different surveying technologies, developments, and various environmental applications. The course is designed to bridge geography, coastal and marine studies, oceanography, digital mapping, hydrographic surveying, marine spatial planning, remote sensing, and Geographical Information Systems (GIS). Practical experience with hydrographic charts and tide tables for navigation provide an opportunity to introduce the student to a skilled area that may form the basis for a future career.

Subject Topics

1. The Principles of Hydrographic Surveying
2. Positioning
3. Depth Determination
4. Hydrographic practice
5. Cartography

Subject Outline

Topic	Content
1. The Principles of Hydrographic Surveying	● General Introduction ● Course Objectives and goals ● Hydrographic Surveying General Aspect ● Theory of Errors ● Survey Standards ● Framework of Hydrographic Survey ● Basic Trigonometry
2. Positioning	● Geoid/Spheroid/Ellipsoid ● WGS 84 Description ● Projections and Grids ● Datum Shifts and Conversion ● Positioning GPS ● Tidal Theory ● Tide Levels and Datum ● Tidal Observation
3. Depth Determination	● Sound Velocity ● Acoustic ● Depth Measurements ● SBES Calibration ● SSS ● SBES and SSS Survey
4. Hydrographic practice	● Survey Planning and Reconnaissance ● Horizontal Control ● Conducting levels

5. Cartography	• Nautical Cartography • Nautical Charts planning • Nautical Charts Production • Digital Nautical Charts • Hydrographic Note

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the general purpose of conducting the hydrographic surveys and various components in facilitating the survey to be carried out.
2. Explain the various position fixing methods and techniques of measuring depths.
3. Explain the tidal theory and the establishment of sounding and chart datum.
4. Plotting, reduction and the interpretation of field survey data.
5. Describe remote sensing technologies and techniques for bathymetric mapping
6. Understand the parameters affecting the uncertainty of reduced soundings and bathymetric data products.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests **(30 %)**
Assignments **(20%)**
Final Examination **(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Written Assignment:** There will be two written assignment weighing 20%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
De Jong, C.D., Elema, I.A., Lachapelle, G. and Skone, S., 2002. *Hydrography*. VSSD, Delft Academic Press.

References
Bannister, A. and Raymond, S. Surveying, Pitman, latest edition, London. Shepherd, F.A., Surveying Problem and Solutions, Arnold, latest edition, London Departmental Modules and Lecture Notes

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV312 STATISTICS FOR SURVEYING

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Statistics for Surveying
Subject Code: SV312
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 16
Delivery Mode On campus
Prerequisites: MA117, MA215, MA225
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

All survey measurements contain some degree of errors. The concepts of Error Theory and the associated Statistical Techniques are important for surveying computation and errors propagation analysis. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual aspects underpinnings error propagations and statistical adjustment techniques. Ultimately, the course will empower students to delve more deeply into advanced Statistical adjustment logarithms to test errors in survey measurements to determine if the survey data can be accepted or rejection with respect to the specific survey specifications.

Topics

1. Types of Errors and Measures of Central Tendency and Dispersion
2. Propagation of Systematic and Random Errors,
3. Statistical Techniques to Test Errors for acceptance and rejection of survey observation
4. Planning of survey measurements to achieve survey specifications
5. Aggregation, generalization and dispersion theory for spatial data sets 6.
6. Introduction to Least Square Adjustments

Subject Outline

Topic	Content
1. Types of Errors and Concepts and Analysis of Central Tendency and Dispersion	● Definition of terms, characteristics and sources of errors Concepts of different Statistical analysis techniques to evaluate precision and accuracy of single and groups of survey measurements;
2. Propagation of Systematic and Random Error	● Nature, Characteristics and Sources of Systematic and Random errors. Spatial analysis techniques (Mean, SD and Normal Distribution). Field techniques to avoid/minimize them
3. Statistical Techniques to Test Errors for acceptance and rejection of survey observation	● In, depth study of the different statistical methods (T, F & Chi Square Testing), to test errors prevalent in survey observations.
4. Planning of survey measurements to achieve survey specifications	● Discuss the appropriate field survey techniques to meet survey accuracies. Concepts and application of statistical methods on survey observations for the definition of specifications /accuracies
5. Aggregation, generalization and dispersion theory for spatial data sets	● Fundamental Concepts to aggregate, generalize spatial data. Theory of diversion for spatial data. Apply basic statistical analyses for thematic mapping and spatial data aggregations, generalizations and polygon manipulations.
6. Introduction to Least Square Adjustments	● Introduction to the fundamental concepts of Least Square Adjustments using survey data - Prerequisite for SV 327

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Apply statistical tests to data to assess precision and accuracy of single and groups of linear measurements
2. Use partial differentials to derive error analysis of linear and non-linear functions;
3. Apply statistical methods for the definition of specifications;
4. Apply basic statistical analyses for thematic mapping and spatial data aggregations, generalizations and polygon manipulations.
5. Understand and apply the fundamental concepts of Least Square Adjustment of Survey data.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30 % towards the final grade for the subject.

Assessment 2 - **Written Assignment:** There will be two written assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Cooper, M.A.R., Fundamentals of Survey Measurement and Analysis.

References
Handouts and data provided through Google Classroom

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV313 GEOSPATIAL SURVEYING

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Geospatial Surveying
Subject Code: SV313
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15
Delivery Mode On campus/Online
Prerequisites: SV223
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The Geospatial Surveying subject includes fundamental skills to be attained for field and office-oriented applications in the surveying profession. The conventional field methods of the profession have been replaced by latest State of the Art Technologies and systems together with the automation of mapping analytical and processing software developed to replace manual freehand drafting. The principle concepts of Survey are retained however the enhancement of the productivity is being assisted by this advance Technologies and system available. This course builds on the fundamentals of Surveying Technology and Mapping systems and gradually moves towards advanced techniques and their applications in real world. The Spatial Dataset are manipulated in advance post processing techniques and further analyzed to efficiency in civil applications. The analysis of the survey itself and the spatial linking of the survey data with other datasets are also explored.

Subject Topics

1. Conceptual principles of Surveying Technology and Photogrammetry
2. Global Navigation Satellite Systems and Ground Control Targets
3. Principles of Space based Surveys and Remote Sensing
4. Satellite RADAR and LiDAR Technologies, Thermal and Optical Sensors, Hyperspectral Remote Sensing
5. UAV's and Flight managements
6. Large Scale Mapping and Topographic

Subject Outline

Topic	Content
1. Conceptual principles of Surveying Technology, Photogrammetry, Remote Sensing	• Definitions of Terms • Acronyms • Concept of Space based technology
2. Global Navigation Satellite Systems and Ground Control Targets	• Establishment criteria's of GCPs • Selective approach of GCPs
3. Principles of Space based Surveys and Remote Sensing	• Compare and Contrast of RADAR & LiDAR Systems • Hyperspectral Sensors and civil applications
4. Satellite RADAR and LiDAR Technologies, Thermal and Optical Sensors, Micro and Hyperspectral Remote Sensing	• Compare and Contrast of RADAR & LiDAR Systems • Hyperspectral Sensors and civil applications
5. Unmanned Aerial Vessels & Systems UAVs and Flight managements	• Various types of advance UAVS and their specifications • UAV selection Criteria and category of Survey • Navigation heights and radius • Flight, weather and payloads, KML flight planning

6. Large Scale Mapping and Topographic Surveys	● Digital Terrain Mapping ● Topographic Map Productions and Map Scales

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain Geospatial Surveying principles and its importance as a modern technology.
2. Capture, manipulate, analyze and interpret variety of Geospatial dataset applied by professionals in the Surveying and Civil industry.
3. Examine point cloud data to derive important land surface parameters for spatial information and applications.
4. Apply mathematical relationships describing the fundamental of photogrammetry and geodesy to the natural surface of the earth.
5. Identify sustainable measures to be applied in Engineering projects in built environment and resource management.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(15 %)**
Laboratory Assignment	**(15%)**
Written Assignments	**(15%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 15% towards the final grade for the subject.

Assessment 2 - **Laboratory and field work. T**he Laboratory assignment will contribute 15% towards the final grade for the subject.

Assessment 3 - **Written Assignment:** There will be one written assignment weighing 15%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 5%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Schofield, W and Breach, M, (2007), Engineering Surveying, 6th Edition, ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References
- Construction Surveying Field Manual (1985)
- Topcon Positioning Partners User Reference Manual (2016)
- UAV Manual
- AUS pos website

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV314 ENGINEERING SURVEYING II

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Engineering Surveying II
Subject Code: SV314
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 **(**2 Lectures + 2 Tutorials + 2 Practicals)
Delivery Mode On campus
Prerequisites: SV222
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides the students with basic understanding on applications to real practical surveys from visionary concepts to actual design and construction phase in development stages. Engineering surveys prepares students to appreciate the form of environment and the type of terrain a project proposal is going through to provide the most suitable instrumentations, the methodology a surveyor need to employ at the most economical cost input into the project to sustain budget limits.
This subject also provides the students to exercise common sense in executing decision making for safety of workforce based on the methodology of survey to be applied with considerations of topography and the socioeconomic environment.

Subject Topics

1. Overview of surveying fundamental principles and techniques - "from the whole to the parts
2. Types of errors affecting surveying measurements, their nature and characteristics and ways of minimising their occurrences on measured quantities.
3. Precision engineering surveys: reconnaissance, planning, establishment of survey control networks, horizontal and vertical
4. Design of engineering construction works: road alignment, drainage, culverts, bridges, pipelines, transmission lines etc. and calculation and setting out surveys.
5. Calculation and setting out transition, compound horizontal and vertical curves.
6. Route Alignment Reserves for right of Construction on Parallel and varying widths

Subject Outline

Topic	Content
1. Principles and Techniques of Engineering Surveying	● Instrumentations and Methodologies of Engineering Surveys, ● Instrumentations and applications to various types of Engineering Surveying, ● The use of Total Stations, GPS, Clinometer, Compass and Field Book recording systems
2. Error propagation in Surveying	● Error propagation in Surveying by use of different Instruments and Methodologies, Instrumental System Errors, Personal Errors, Natural Errors, Compensating Errors, Mistakes, Accidental Errors
3. Reconnaissance and Planning	● Field reconnaissance, station marking, Office Planning with maps and survey plans. Scheduling of Field Data Capture sequence, Manpower, Instrumentation and Resource planning and managing survey teams.
4. Design Surveys	● Route Alignment and Running chainages for Surveys of Road/Highways, Drainage, Bridge sites.
5. Calculations and Setting out Horizontal Curves and Batter Pegs	● Horizontal Curve design and set out by deflection and coordinate methods, Design from longitudinal section and batter set out and Vertical Curves designs, Longitudinal Section design, Cross Sections and Area and Volume from running chainages.
6. Road Reserve	● Equal and variable width road reserves computations and boundary survey set out for land acquisition process.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the surveying fundamental principles and techniques, "from the whole to the parts";
2. Understand the main types of errors affecting survey measurements and ways of minimizing their occurrences with different survey Instruments and methodology
3. Carry out linear route designs with aid of existing available material such as maps, aerial/ LiDar/ Photogrammetric maps and survey plans to determine preliminary alignments for Roads, Drainage, power line, water, sewerage reserves
4. Carry out the engineering design construction works, earthworks calculations and setting out surveys from Road Centreline design, area and volumes to Reserves/Easements for right of construction with in gazetted route alignment.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%. To obtain a pass grade in this subject, 50% overall must be achieved and at least 25% achieved in the final examination.

Students must also refer to the Subject Assessment Details.

Tests	**(30 %)**
Assignments	**(10%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 3 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in written form. Contributes 10% towards the final grade for the subject

Assessment 3 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 4 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Bannister, A., and Raymond. S., Surveying, Pitman, latest edition, London;

References
- Clark, D., plane & Geodetic Surveying, Vol.1&2, Constable, latest edition, London.
- Departmental Modules References.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV321 INTRODUCTIONS TO GEODESY

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Introductions to Geodesy
Subject Code: SV321
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**2 Lectures + 3Tutorial+ 2 Practicals)
Delivery Mode On campus
Prerequisites: SV223
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

Geodesy is the science of accurately measuring and understanding three fundamental properties of Earth: its geometric shape, its orientation in space, and its gravity field, as well as the changes of these properties with time. Development of geodetic techniques and instrumentation GPS, DORIS, Laser Ranging and other geodetic measuring tools have improved geodetic techniques dramatically. Geodetic observing systems provide a significant benefit to society in a wide array of civil, research, and commercial areas, including sea level change monitoring, autonomous navigation, precision agriculture, civil surveying, earthquake monitoring, forest structural mapping and biomass estimation, and improved floodplain mapping. Relationship between the ellipsoid, the geoid and the Mean Sea Level is taught to students in a practical approach by use of Survey grade GNSS receivers. GNSS satellite data is processed on the default WGS84 Ellipsoid surface, reduced to the Geoid and define the deviation of the Geoid from the Mean Sea Level by application of precise differential levelling. Convergence, Arc to Chord, Scale Factors and reductions from the ellipsoid surface to the Plane Topographic surface will be taught. Introductions to the ellipsoid/spheroid surface will be given to understand the basic concepts of measurements along the Meridian, the Normal and the mean radii of earth from any given location within PNG with reference to the global WGS84, GRS80 and the AGD66 ellipsoid surface measurements and computations.

Subject Topics

1. Heat transfer Application
2. Explain the physical relationship between the ellipsoid, the geoid, spheroid and Projections;
3. Explain the properties of the Ellipsoid/Spheroid
4. Document and explain the requirements and techniques involved in establishing higher order Horizontal and Vertical control networks;
5. Carry out geodetic computation on the PNG94 Map Grid (PNG94MG), AGD66

Subject Outline

Topic	Content
1. Relationship of the Ellipsoid, the Geoid and the Mean Sea Level and the Topography	● Difference and the links between each surface, and applicability to Surveying
2. Properties of the Ellipsoid, the Geoid and the Mean Sea Level and the Topography	● Practical Aspect of the differing Ellipsoid Surface and the Geoid from GPS/GNSS observations and reductions from the Ellipsoid to the Geoid. The Geoid is then compared to the MSL
3. Documentation, requirements and techniques involved in establishing higher order control networks	● National geodetic Datum, the reference frame,Precision and Order of Surveys for Horizontal and Vertical Surveys, Instrumentation, calibration and standardization of instruments, transformation, Scale Factors, Arc to chord corrections. Survey Control applications to Photo Control Mapping, connections to Primary Geodetic Network
4. Elements and Properties of the Ellipsoid	● Parameters of the Ellipsoid, the differentiation between different ellipsoid surfaces. Properties of the Ellipsoid, Meridian and Normal, ρ, ⬤, R, r, Δφ, Δ✛ Computations Introductory on WGS84, PNG94 (GRS80) & AGD66

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the physical relationship between the geoid, Ellipsoids and Projections;
2. Explain the properties and difference between different Ellipsoid surfaces
3. Document and explain the requirements and techniques involved in establishing higher order control network;
4. Carry out computation on the Ellipsoid surface WGS82, GRS80 (PNG94) Map Grid and AGD66

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%. To obtain a pass grade in this subject, 50% overall must be achieved and at least 25% achieved in the final examination.

Students must also refer to the Subject Assessment Details.

Tests	**(25 %)**
Assignments	**(10%)**
Quiz	**(15%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 25% towards the final grade for the subject.

Assessment 2 - **Assignment/Group work:** There will be practical assignment weighing 10%. Practical Assignment is based on field data capture, processing and output of coordinates to usable formats for Surveying, GIS and Mapping. It is advisable that student should have the appropriate GNSS software loaded onto their laptops for data processing.

Assessment 3 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 15%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Bannister, A., and Raymond Baker, R.,Solving Problems in Surveying, Longman Scientific and Technical, J. Wiley & Sons,Inc., New York.

References
- Geocentric Datum of Australia 1994 (GDA94) Technical Manual V2.4 pdf, http://www.icsm.gov.au
- Differential GPS Explained, Trimble Navigation

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV322 MINE SURVEYING

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Mine Surveying
Subject Code: SV322
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**2 Lectures + 2Tutorial +2 Practicals)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The profession of Mining Engineering is concerned with the safe, effective, worthwhile and environmentally responsible operation of mineral extraction in order to meet the ever-expanding demand from the world neighbourhood for mineral commodities. Mining engineers are required to supervise any segment of the mining process, which can be influenced via computing and records technology, globalization, monetary reforms and environmental considerations. These elements require mining engineering to be a multifaceted discipline.

Similarly, the role of the current mine surveyor has different such that he or she is concerned with the surveying and mapping of surface and underground mine workings, legalities of boundaries, mine planning, neighbourhood and regional development, mine closure procedures and information systems. In practice, the complete mining process necessitates the name for the mining engineer to possess various skill sets, such as cutting-edge surveying practices.

Subject Topics

1. Introduction to Mine Surveying
2. Drilling Surveys and its application
3. (Drone Data) Lidar and EDM data
4. Open cut mine surveying
5. Introduction to GPS/GNSS in mining
6. Data exchange, transfer to End-Users desirable formats and presentation.

Subject Outline

Topic	Content
1. Introduction to Mine Surveying	● Roles of Mine Surveyor, Mining Terminology, Function of Mine Survey Office ,(Exploration Surveys, Mine Planning and Design, Development Surveys),Mine Datum, Preparation of Mine Plans, Earth work quantity calculations and Quantity Measurement
2. Drilling Surveys and its applications	● Collars and Targets, Drilling facilities and equipment and Specified types of Drilling for ore extraction
3. (Drone Data) LiDAR and EDM Data	● Functions of EDM, Angle and Distance Measurements, Functions of Drone, Methods of data extraction using drone, Lidar data processing for volume computation and quantity measurement and material costing
4. Open cut mine surveying	● Exploration Surveys and Control Surveys
5. Introduction to Global Navigational System / Global Navigational Satellite System in mining	● Introduction to hand held GPS/GNS and Application of GPS
6. Data exchange, transfer to End -Users desirable formats and presentation	● Data formats, Conversion of Data and Desirable Data output

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Explain the various terminologies used in the mining environment.
2. Understand the functions of a mine survey, its office roles and responsibility.

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3. Examine survey raw data in Surveying platform and doing computation of Boreholes, Volumes and Areas.
4. Differentiate between drone and Electronic Distance Measurement data with its application in mining, both for open & underground mine layout together with data conversion methods.
5. Understand the principle of development survey and its application to the mining industry.
6. Examine the basic method of GNSS/GPS and its appropriate use.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(20 %)**
Laboratory and field work	**(15%)**
Assignments	**(10%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 20% towards the final grade for the subject.

Assessment 2 - **Laboratory and field work** There will be one laboratory assignment weighing 15%. Laboratory assignment will be carried out in computerized laboratory buildings, using offline surveying software's. Students may use laptops / lab computers supported by University to conduct the assignment task within specified time. It's suggested that students have backup drives. Students must not turn off laptops / computers, exit the laboratory room or remove any file in front of the machine.

Assessment 3 - **Assignment** There will be two written assignment weighing 5% each. Students can take assignment tasks to their accommodation facilities where they can plan them by referring to internet and other research materials with proper reference. Feedback can help teachers re-emphasize subjects that are focused on learner needs.

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 5%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Schofield, W and Breach, M, (2007), Engineering Surveying, 6th Edition, ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References

- Bannsiter, A., and Raymond, S., Surveying, Pitman, latest edition, London
- Shepherd, FA, Surveying problems and solutions, Arnold, latest edition London
- Whyte, R.Paul., Basic Surveying Fourth edition, London
- Engineering Surveying lll. Study Book I Unit 77405

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV323 ADJUSTMENT IN SURVEYING MEASUREMENTS

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Adjustment in Survey Measurements
Subject Code: SV323
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 (2 Lectures + 2vTutorial + 2 Practicals)
Delivery Mode On campus
Prerequisites: SV222, SV312, SV223
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

An adjustment of survey measurements is very essential in survey measurements. It enables best estimates of values in several measurements to obtain higher precision. This course builds on the fundamentals of least square adjustments of survey measurements and gradually enhances the understanding of adjustments utilized in the instrument and applications. The course emphasizes a hands-on learning environment, with in-depth insights into theoretical and conceptual underpinnings survey adjustments. Ultimately, the course will empower students to enhance the knowledge more deeply into adjustments of survey measurement to improve the precision and accuracy of the measurements.

Subject Topics

1. Introduction to Basic Matrix Equations
2. Review theory of errors & Statistical Analysis
3. Weighted observations
4. Statistics for joint distribution function
5. The concepts of adjustments
6. Propagation of errors

Subject Outline

Topic	Content
1. Introduction to Basic Matrix Equations	● Overview of Matrix algebra operations (addition, subtraction, multiplication, Transposition, inversion of matrices. ● Basic theory of errors and statistical analysis ● Theory of least squares and concepts of weighting observations.
2. Review theory of errors & Statistical Analysis	● Sources of errors ● Types of errors/classification of errors ● Types of observations ● Precision and Accuracy ● Measure of central tendency
3. Weighted observations	● Properties of weight
4. Statistics for joint distribution functions	● Covariance and correlation
5. The concepts of adjustments	● Condition equations ● Methods for Determination of MPV with Least Square Approach ● Properties of mean
6. Propagation of errors	● Error propagation ● Error equation for linear function ● Application of error equation for linear function ● Standard Error of the Weighted Mean

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Understand and identify the categories of the errors and apply the appropriate techniques of adjustments.
2. Understand and build the conceptual framework for adjustment of survey measurements and conceptuality of least square adjustments.
3. Enhance the knowledge of adjustments so that they can be able to adjust the geodetic networks and other network adjustments in the real world of surveying.
4. Recognize the adjustments performed systemically by the surveying instrument such as GNSS.
5. Apply mathematical relationships describing fundamental physical, geometric, and computational principles relevant to adjustments of survey measurements.
6. Apply the theoretical and conceptual about the adjustments of survey measurements to improve the accuracy and the precision by eliminating the discrepancy and the residuals.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Written Assignment:** There will be two written assignment weighing 10% each. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 5%.

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Bannister, A and Baker, R. 1994, Solving Problems in Survey, 2nd Ed, Longman Scientific and Technical, J. Wiley & Sons, Inc., New York;

References
- Clark, D. Plane & Geodetic Surveying, Vol. 1,2, Constable, latest edition, London;
- Wolf, P. R., Adjustment Computations – Practical Least Squares for Surveyors, Landmark Enterprises, Rancho Cordova, Ca 95670; 2nd Ed., 1987
- Departmental Modules and Lecture Notes.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV324 FIELD WORK I

Course(s):	Bachelor of Surveying (NQF Level 7)
Subject Name:	Field Work I
Subject Code:	SV324
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	15 **(**2 Lectures + 2Tutorial + 2 Projects*) * Field Work I will have regular 2 Lectures & 2 Tutorials hr/week throughout the semester for preparation on field work and related analysis. Based on the nature of activities, these Lecture & Tutorials sessions may or may not require any supervision. However, in the practical/field component, students will be taken out on survey camping for one full week, which is equivalent to 2 hrs of practical per week for the entire semester.
Delivery Mode	Field/Outside campus
Prerequisites:	SV121, SV122, SV221, SV222, SV223
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

This course will provide a basic knowledge of practical implementation of the different survey techniques which must be encounter in the future to produce a precise Topographical Map. Basically performing control survey, including practical field techniques used in levelling, traversing, GPS GNSS and Drone surveying. It enhances the practical knowledge thereby implementing different work and in other side it involves self-assured feeling everlastingly. It guides the path ending with success.

Subject Topics

1. Introduction
2. Topographic Surveying
3. GPS GNSS Survey
4. UAV Survey Design and Basics Principles
5. Data Processing and Analysis using Survey Software

Subject Outline

Topic	Content
1. Introduction	● Reconnaissance Survey; Location, Site, Topography & Geology, Description of Work, Work Details and Schedule.
2. Topographic Survey	● Total Station Traversing ● Travers Computation; Balancing the Traverse, Closing Error ● Detail Survey ● Leveling
3. GPS GNSS Survey	● Setting up of GPS Receivers for Datum Establishment ● GPS GNSS Data Processing
4. UAV Survey	● Flight line orientation block and linear features ● Forward Image movement calculations ● Sun angle calculations and effects ● Ground control design and layout ● GPS air-station basics
5. Data Processing and Analysis Using CAD and GNSS Software	● Total Station Raw Data Downloading, Processing and Editing using Magnet Office and AutoCAD ● GPS Data Downloading and processing using GNSS Solution ● Importing and processing Drone Images

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Relate with the problems that they may arise during the Field work especially from proper handling of instrument and their functions
2. Relate with the spirit and importance of teamwork, as surveying is not a single person's work
3. Manage the given project in schedule time and thus knows the value of time in which to collect required data in the field in systematic way.
4. Compute, process and manipulate the observed data in the required accuracy and present it in required plan format
5. Prepare a robust final Report

Assessment Tasks and Weightings
This field camp is a continuous assessment graded out of 100%. The student must reach a satisfactory level of competency in order to pass the field camp. This level of competency is assessed by successfully completing all of the practical exercises related to the paper's aims and objectives. There is no final exam associated with this paper.

Students must also refer to the Subject Assessment Details.

Attendance and work ethic in the field	**(20 %)**
Laboratory Task	**(30%)**
Report Writing	**(50%)**

Assessment 1 - **Attendance and work ethic in the field:** Course supervisor will be keeping on eyes upon you in the field exercises how best you give your output into the field task and your behavior is the most important. 20% marks will be assigned for this task.

Assessment 2 - **Laboratory Task:** There will be one laboratory task after field to prepare different type maps which will weigh 30%. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Report Writing:** There will be a maximum 50 pages' field report submitted by the students after back from the field. It will carry 50% marks. Before submitting the report course coordinator provided details marking criteria to the students.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
There are no textbooks required for this paper. However, access to a survey text or the Lecture notes from the pre-requisite subjects will greatly assist the student during the camp.

References
Departmental Modules and Lecture Notes

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

FOURTH YEAR
SV411 SUBDIVISION DESIGN & PRINCIPLES

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Subdivision Design & Principles
Subject Code: SV411
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 15 **(**2 Lectures + 2Tutorial + 2 Practicals)
Delivery Mode On campus
Prerequisites: SV221
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The Subdivision Design & Principles subject are fundamental skills to be attainment for field and office-oriented applications in surveying profession. The Land Development & Urban Sprawl have been an ongoing problem in the Major Cities of Papua New Guinea where necessary planning and implementation requires to be made to resolve these issues. The boundary redefinitions and Subdivision of parcel of Land is an underlying task which a Graduate Surveyor requires to exercise his/her skills to demarcate the land development. With the availability of Technology, Surveyors requires to efficiently plan out the Parcel of Land in line with the Physical Planning Standards of Papua New Guinea as well as the maximizing the use of the latest technology. The PPA and Survey Coordination Acts are vital guide understand the principles of Planning and Standards that are practiced in Papua New Guinea.

Subject Topics

1. Conceptual principles of Planning and Subdivision Designs
2. Introduction to Zoning, Rezoning and Declared Development Areas
3. Application to National and Provincial Physical Planning Board
4. Principles of Reserves and Easements and Utilities
5. Standard Allotment layout criteria and Designs

Subject Outline

Topic	Content
1. Conceptual principles of Planning and Subdivision Designs	● Definitions of Terms ● Acronyms ● Types of Physical Planning
2. Introduction to Zoning, Rezoning and Declared Development Areas	● Town Gazetted Areas / Cites Limits ● Planning ● Rezoning / Zoning / Subdivision
3. Application to National and Provincial Physical Planning Board	● Preparation of Documentations, ● Letters and Plans for proposed Subdivision
4. Principles of Reserves and Easements and Utilities	● Introduction for Road Reserve / Power
5. Standard Allotment layout criteria and Designs	● Standard Road Reserves and Hierarchy ● Residential, Commercial and Industrial ● Recreational/ Open Space or Public Space

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain Subdivision principles and its importance in modern technology.
2. Capture, manipulate, analyze and interpret variety of Geospatial dataset applied by professionals in the Surveying and Civil industry.
3. Examine point cloud data to derive important land surface parameters for spatial information and applications.
4. Apply mathematical relationships describing the fundamental of photogrammetry and geodesy to the natural surface of the earth.
5. Identify sustainable measures to be applied in Engineering projects in built environment and resource management.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Test	**(25 %)**
Laboratory Assignment	**(10%)**
Written Assignments	**(10%)**
Quiz	**(5%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 25 % towards the final grade for the subject.

Assessment 2 - **Laboratory and field work (if any)** There will be one laboratory assignment weighing 10%. Laboratory assignment will be conducted in computerized lab facilities, using Geospatial software offline and Network license. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. It is advisable that student should carry back-up drives. Student must not turn off laptops/computers nor leave the lab room nor delete any file before the computer-based task is checked by the examiner. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Written Assignment:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 10% towards the final grade for the subject

Assessment 4 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 5%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Schofield, W and Breach, M, (2007), Engineering Surveying, 6th Edition, ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References
- Construction Surveying Field Manual (1985)
- Topcon Positioning Partners User Reference Manual (2016)
- UAV Manual
- AUS pos website

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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SV412 Survey Practice I

Course(s): Bachelor of Surveying (NQF Level 7)
Subject Name: Survey Practise I
Subject Code: SV412
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 18 **(**3 Lectures + 3Tutorial)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides students with an overarching understanding of professional surveying practice as a career or business in the industry with specific emphasis to judicious work place conduct, couple with good comprehension of the essence of prudent project planning implementation and management, organization structures, decision making and business types and form and relevant laws and regulations that governs business dynamics in the country.

Subject Topics

1. Prominence of Project Planning (CPM) and Management in the context of Planning and Managing Survey Projects
2. Significance and Essential Aspects of Organization.
3. Essence and Eminence of Decision Making in an Organization
4. Quintessence of Corporate Governance, Professional Standards and Ethical Values.
5. Practice Surveying as a Professional business in the Corporate Business environment.
6. Surveyor as an Agent of Change in a Societal and Development Settings**.**

Subject Outline

Topic	Content
1. The Prominence of Project Planning (CPM) in the context of planning and managing survey projects.	● Different Stages of Project Planning and Management with emphasis on Critical Path Method (CPM), the Triple constraints (Project Management Triangle). The primary role, aim and objectives of the Project Manager in the context of planning, executing and managing survey projects – *The Whole to Part Concept.* The main distinctions between Business and Project Management.
2. The Significance and Essential Aspects of an Organization	● Organization Structure, Vision and Mission Statements, ● Strategy and how these impact individual employee's career prospect, decision making and their shared responsibilities to contribute towards achieving the organization's strategic targets and success.
3. The Essence and Eminence of Decision Making in an Organization or	● Phases of Decision Making. The Theory of Management Science based on Quantitative Decision Making Model (DSS). Types of Decisions and their relevance in the overall welfare and affluence of the employees and the organization.
4. Quintessence of Corporate Governance and Professional Standards and Ethical Values.	● Concepts associated with Corporate Governance, Professional Standards and Ethical Values. Types of Professional Ethics. Attributes of good Professional Leadership.
5. Practice Surveying as a Professional Business in the Corporate business environment	● The various aspects pertaining to different types and forms of business prevailing in the global business landscape. Surveying Professional credentials and Requirements to practise Surveying as a business. The national regulatory frame work (Company's Act, IPA & IRC) which governs and monitors the business in the country.
6. Surveyor as an Agent of Change in any societal and development settings.	● The important role professional surveyors play as Agents of Change in the societal development agendas in all tiers of the Nation building

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Devise a Survey Project Work Plan using CPM and the Theory of Whole to Part.
2. Recognize the Organization Structures and associated Strategic traits to achieve organization's opulence.
3. Identify and apply the correct decision type for a given decision scenario and assess their impacts and consequences to achieve a satisfactory outcome.
4. Practice the quintessence of prudent Corporate Governance, and judicious Professional and Ethical workplace conduct to achieve expected performance results.
5. Examine the different types and forms of business and comply with the provisions of the prevailing Statutory Laws and Regulations to operate surveying business
6. Illustrate the role surveyors play as an Agent of Change in the societal development agendas.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(30 %)**
Assignments	**(10%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 2 - **Assignment:** There will be one assignment weighing 10%. Student will take home assignment tasks consisting of a number of questions/numerical problem/diagram covering the below mentioned topics. Student can refer to internet and other study materials with proper referencing.

Assessment 3 - **Quizzes:** These are very short, short answer, or multiple choice questions which are to check if students did understand some of the important components of lectures and collectively weigh 10%.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Tashjian Peter C., Business Organizations in PNG

References
1. PNG Company ACT, IRC ACTS and IPA ACT
2. Departmental Modules and Lecture Notes.
3. Internet Sites directed by the subject lecturer.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV413 SURVEYING PROJECT I

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Surveying Project I
Subject Code: SV413
Duration: 13 Teaching weeks
Contact Hours: 11 Hours per week
Credit Points: **15 (**11 Practicals / Consultations)
Delivery Mode On campus
Prerequisites: FT211
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

Student to investigate and identify a project, outline its goals, objectives and hypotheses if appropriate and research into the intellectual aspects of the project theme. This will involve: Development of a research or project proposal, literature reviews, set readings and abstracting; Data Collection and Fieldwork as appropriate; Data Analysis; Project Planning and Design; Write-up and an oral presentation in-person following a viva-voce examination format of the project proposal. The work will be undertaken with the guidance of a supervisor or supervisor(s), at least one of whom will be appointed from the academic staff of the Department. External Sponsor(s)/Supervisor(s) outside of the Department may also be involved.

Subject Topics

1. Project Introduction
2. Literature Review
3. Progress Presentation
4. Proposed Methodology/Analysis
5. Discussion / Conclusion and Final Presentation

Subject Outline

Topic	Content
1. Project Introduction	● Background information provides an overview of the topic to be investigated. ● Appropriateness of aim, research question or testable hypothesis.
2. Literature Review	● Literature selected is appropriate to the aims of the study. ● There is critical analysis of the literature selected. ● Critical analysis is meaningful and of sufficient depth. ● Contrast & comparison of the literature is present. ● Literature review makes a clear case for the research question/ hypothesis
3. Progress Presentation	● Assess Validity of Progress Report through Formal Presentation
4. Proposed Methodology / Analysis	● Selection of research method is justified. ● Appropriate use of materials or equipment. ● Accessibility of equipment. ● Comprehensive description of proposed test procedure/ methodology. ● Estimate of resource requirement. ● Description of an appropriate pilot study. ● Justification of proposed chosen method(s) of data analysis. ● Indication of outcome measure(s), including proposed levels of measurement
5. Discussion / Conclusion and Final Presentation	● Indication of possible study limitations. ● Potential impact of study on wider community discussed. ● Appropriate summary of the main research proposal. ● Final Proposal Presentation

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Produce a well-constructed articulated research project proposal.
2. Discuss the research or project proposal with the supervisor and make a final articulate verbal and written presentation of the proposal.
3. Demonstrate the ability to carry out a defined literature review on a subject or topic.
4. Demonstrate the ability to analyse and synthesize research material accurately and concisely.
5. Demonstrate referencing skills

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no Final examination.

Students must also refer to the Subject Assessment Details.

Project Title & Synopsis:	**(5 %)**
Student-Lecture Consultations:	**(10%)**
Oral Presentations (Viva-Voce Examination)	**(35%)**
Written Research Proposal:	**(50%)**

Assessment 1 - **Project Title & Synopsis:** This assessment weighs 5%. The title of the proposal and its aim and objective(s) must be suitably defined and stated clearly with the intellectual enquiry being evident in the initial stage in the proposal. Feedback will assist the co-ordinator re-emphasize topics and assign a supervisor based on learners proposed topic of interest.

Assessment 2 - **Student-Lecture Consultations:** This assessment weighs 10%. The student is required to have formal sessions with his/her supervisors, in order for the supervisor to assess whether the student demonstrates an intellectual grasp of the topic and understanding of the scope of the research proposal. Taking into consideration the relevant theoretical literature and the student's ability to demonstrate skills in making use of the literature and other relevant sources of information

Assessment 3 - **Oral Presentations (Viva-Voce Examination:** There will be two presentations each weighing 15% and 20% respectively. The presentations must include the technical approach, literature reviewed and its contribution to the topic, the proposed methodology and preliminary experimental results with a future implementation work schedule. Feedback will assist the teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4 - **Written Research Proposal:** There will be a written research proposal weighing 50%. It is a requirement, though; that the proposal be based on a well-defined and clear research question/ aim with achievable objective(s) of scholarly significance, and that the proposal develops a theoretically and methodologically informed and evidence-based answer to that question/aim/objective(s). The word limit for the proposal is 22,000 words of text, exclusive of appendices, footnotes, tabular material, bibliography or equivalent. The research proposal must be proofread, edited, and technically of the high standard expected of scholarly outputs. The proposal must be written in a coherent, formal style and forms a well-ordered whole. The proposal must observe the conventions and practices of the chosen referencing style (any style can be used, as long as it is used consistently and correctly)

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

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Subject Text book

- The Writing Lab & The OWL at Purdue 2020, Writing a research paper, Purdue University, Indiana, viewed 20 January 2021,
- https://owl.purdue.edu/owl/general_writing/common_writing_assignments/research_papers/index.html

References

- American Psychological Association. 2010. Publication manual of the American Psychological Association, 6th ed., Washington, DC.
- Style manual for authors, editors and printers 2002, 6th ed., Wiley Australia.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV414 GEODESY I

Course(s):	Bachelor of Surveying (BSVY (NQF Level 7)
Subject Name:	Geodesy I
Subject Code:	SV414
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	**16 (**2 Lectures + 4 Tutorials)
Delivery Mode	On campus
Prerequisites:	SV321
Co-requisites:	Nil
Subject Coordinator:	TBA

Synopsis

Geodesy is the science of accurately measuring and understanding three fundamental properties of Earth: its geometric shape, its orientation in space, and its gravity field, as well as the changes of these properties with time. Development of geodetic techniques and instrumentation GPS, DORIS, Laser Ranging and other geodetic measuring tools have improved geodetic techniques dramatically. Geodetic observing systems provide significant benefit to society in a wide array of civil, research, and commercial areas, including sea level change monitoring, autonomous navigation, precision agriculture, civil surveying, earthquake monitoring, forest structural mapping and biomass estimation, and improved floodplain mapping. Relationship between the ellipsoid, the geoid and the Mean Sea Level is taught to students in a practical approach by use of Survey grade GNSS receivers where the GNSS satellite data is processed on the default WGS84 Ellipsoid surface, reduced to the Geoid and define the deviation of the Geoid from the Mean Sea Level by application of precise differential levelling. Convergence, Arc to Chord, Scale Factors and reductions from the ellipsoid surface to the Plane Topographic surface will be taught.

Understanding of the ellipsoid/spheroid surface clarifies the basic concepts of measurements along the Meridian, the Normal and the mean radii of earth from any given location anywhere on the earth's surface with reference to any geodetic system such as WGS84 or GRS80 (PNG94) and the AGD66 ellipsoidal surface measurements and computations.

Subject Topics

1. Geometry of the Ellipsoid & the theoretical aspects of the ellipsoidal parameters.
2. Computations on the surface of the Reference Spheroid: Radii of Curvature and the Mean Radius of the earth at any given latitude
3. Distance along a single Meridian (Forward and Reverse),
4. Arcs of Parallel (Forward and Reverse).
5. Gauss Mid-Latitude Formulae (Iterative Formulae); Robbins Rigorous, Formulae for Forward and Reverse Problems (Non-Iterative). Geodetic Reference Systems

For relevance of applications, all computations are encouraged to be done on the PNG's national Geodetic Systems (PNG94/GRS80) Ellipsoid but with reference to WGS84 and AGD66.

Subject Outline

Topic	Content
1. Geometry of the Ellipsoid & the theoretical aspects of the ellipsoidal parameters	• Explain the theoretical aspects of Ellipsoid, the differentiation between different ellipsoid surfaces. Properties of the Ellipsoid, the Meridian and Normal, ρ, ⟊, R, r, Δφ, Δ⌊ etc., for WGS84, PNG94 (GRS80) & AGD66. • Differentiate between the Physical Geodesy and the Geometric Geodesy for the benefits of Vertical Geoid and Ellipsoidal heights and MSL
2. Computations on the surface of the Reference Spheroid: Radii of Curvature and the Mean Radius of the earth at any given latitude	• Introductions to Geodetic Computations, the basic Properties of the Ellipsoid the Meridian and Normal, ρ, ⬤, R, r, Δφ, Δ⏚, ϖ, etc. for WGS84, PNG94 (GRS80) & AGD66 Ellipsoid

3. Distance along a single Meridian (Forward and Reverse),	• Geodetic Computations along the Meridian Close to the Equator and towards the Poles (South) on PNG94/GRS80. • The Direct Method-two points of known coordinates are given along a single Meridian (λ) is given, spheroid distance (s) is determined. • The Indirect Method-One point with Geographical Coordinates is given with spheroid distance (s) to the second point. Coordinates of the second point is determined. Iteration is required • Δϕ" and equivalent in meters is determined along the mean of ϕ.
4. Arcs of Parallel (Forward and Reverse).	• The Arcs of Parallel are lines along a single Latitude that defines East/West directions. • The Direct Method-two points of known coordinates are given, determine the distance. • The Indirect Method-One point is given with coordinates and spheroid distance (s) to the second point. Coordinates of the second point is determined. • Δλ" and equivalent in meters is determined along the mean of λ
5. Gauss Mid-Latitude Formulae (Iterative Formulae); Robbins Rigorous, Formulae for Forward and Reverse Problems (Non-Iterative)	• Direct and Indirect Methods of Position determination by the Gaus Mid Latitude formulae. • The Direct Method-two points of known coordinates are given (φ_1,λ_1 and φ_2, λ_2) is given, spheroid distance (s) Azimuth$_{1-2}$, and Reverse Azimuth $_{2-1}$ is determined. • The Indirect method-One point with Geographical Coordinates (φ_1,λ_1) is given with spheroid distance (s) and Azimuth to point two. Coordinates of the second point (φ_2,λ_2) is determined. Iteration is required. • Robbins Rigorous, Formulae for Forward and Reverse Problems (Non-Iterative).

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Define the terminologies and explain the fundamental concepts/elements of geodesy,
2. Understand the geometry of the ellipsoid and the theoretical aspects of the ellipsoidal parameters.
3. Carry out computations on the surface of the ellipsoid/spheroid: radii of curvature and mean radius of the earth at any latitude; the spheroidal distance along a parallel (forward & reverse); meridional arc (forward & reverse) and the meridian convergence;
4. Understand the theoretical aspects and applications of the Gauss Mid-Latitude Formulae (Forward & Reverse); the Puissant Formulae (Forward & Reverse) and Robbins Rigorous Formulae (Forward & Reverse);
5. Understand the concepts of a geocentric global datum and local datum and their relationships through coordinates and datum transformations.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%. To obtain a pass grade in this subject, 50% overall must be achieved and at least 25% achieved in the final examination.

Students must also refer to the Subject Assessment Details.

Tests	**(30%)**
Assignments	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 4 Tests contributing 30 % towards the final grade for the subject.

Assessment 2 - **Assignments:** There will be 2 written assignments weighing 10% each. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3 **Final written examination:** A 3 hour written examination weighs 50%

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It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Geocentric Datum of Australia 1994 Technical Manual, Intergovernmental Committee on Surveying & Mapping, Commonwealth of Australia Gazette No GN35, 6 September 1995;

References

- Bomford, G., Geodesy (Fourth Edition), Clarendon Press. Oxford, 1978;
- Cross, P. A., Hollwey, J. R., Small, L. G., Geodetic Appreciation (Working Paper No. 2), NELP 1981;
- Ewing, C. E. and Mitchell, M. M., Introduction to Geodesy, Elsevier, New York. Oxford, 1969;
- Torge, W., Geodesy, Walter de Gruyter, Berlin. New York, 1980.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV421 FIELD WORK II

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Field Work II
Subject Code: SV421
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**2 Lectures + 2Tutorial + 2 Practicals)
Delivery Mode On campus
Prerequisites: SV 212 & SV 223
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

Field Work II is a Survey Camp conducted by 4th year Surveying Students for a full one week to demonstrate their Cadastral skills acquired from Year 1 to 4. The course indicates student's ability in Cadastral Surveying which designates whether students are capable of executing their Cadastral Survey Project as it is one of the required projects when applying to be a Certified / Registered Surveyor through the Association of Surveyors Papua New Guinea. The course highlights hands on experiences from reconnaissance survey, acquisition of survey plan and PSM sketches, planning and calculation of original data, actual survey execution to processing and survey data deliverance to clients.

Subject Topics

1. Reconnaissance Survey and Survey Control Establishment.
2. Survey Plan and PSM sketch Acquisition.
3. Planning and Original and Observation comparison calculations.
4. Boundary Identification Survey.
5. Data Processing and Deliverance to Clients

Subject Outline

Topic	Content
1. Reconnaissance Survey and Survey Control Establishment.	● Site Visit and Inspections ● Survey Control Stations Establishment
2. Survey Plan and PSM sketch Acquisition from Government Departments.	● Survey Plan Government Source. ● Understand Survey Plans and Conversions. ● Understand PSM Sketches and Attributes.
3. Planning and original calculation and comparison calculations.	● Boundary Survey Planning. ● Survey Comparisons Calculation and Adoptions (Survey Schedule)
4. Boundary Identification Survey	● Procedure to carry out Boundary Identification Survey. ● Re-Instalment of disturbed Survey Marks. ● Field Booking Record.
5. Data Processing and Deliverance to Clients	● Report Compilations ● Plan Standardization ● Examination of Survey files

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Know Governmental Departments for Survey Plan and PSM Sketches acquisition.

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2. Conduction survey site inspections prior to actual work.
3. Plan, compute and compare survey radiations.
4. Perform Identification Survey and reinstallation of any disturbed survey marks.
5. Survey Data Processing.
6. Cadastral Format Report Compilation, Standardize of Survey Plan and Examination of Survey Files as per ASPNG requirement.

Assessment Tasks and Weightings

To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no Final examination.

Students must also refer to the Subject Assessment Details.

Attendance and work ethic in the field	**(20 %)**
Laboratory task	**(30%)**
Report Writing and Submission	**(50%)**

Assessment 1 - **Attendance and work ethic in the field:** Course supervisor will be keeping on eyes upon you in the field exercises how best you give your output into the field task and your behaviour is the most important. 20% marks will be assigned for this task.

Assessment 2 - **Laboratory task:** There will be one laboratory task after field to prepare different type maps which will weigh 30%. Student can use University provided laptops/ lab computers to carry out the assignment task within stipulated time. Feedback will assist teacher evaluate psychomotor ability of learners.

Assessment 3 - **Report Writing and Submission:** Upon completion of the Course students will provide a Compile Report for the Field Work which is 50% and actual project execution and involvement 50%. Before submitting the report course coordinator provided details marking criteria to the students.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- Schofield, W and Breach, M, (2007), Engineering Surveying, 6th Edition, ISBN–13: 978-0-7506-6949-8, ISBN–10: 0-7506-6949-7 (e-book)

References
- 1.Construction Surveying Field Manual (1985)
- Topcon Positioning Partners User Reference Manual (2016)
- UAV Manual
- AUS pos website

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV422 SURVEY PRACTICE II

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Survey Practice II
Subject Code: SV422
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **18 (**3 Lectures + 3Tutorials)
Delivery Mode On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

The subject provides students with an overarching understanding of the Laws and Regulations pertaining to professional surveying practice, registration and related legal and professional entities.

Subject Topics

1. Roles of Survey Related Organisations/Departments in PNG
2. The Essence and Prominence of Survey Related Professional Organizations
3. Quintessence of Surveyors Code of Ethics and the Surveyors Creeds and Canons.
4. Processes and Requirements to attain Certificate of Competence as Registered/License Surveyor.
5. The Essence and Eminence of Survey Laws and Regulations, Survey Direction (SD) and Department of Works Standard Survey Instructions (DOWSSI) including ILG and SABL
6. Processes and requirements for lodgements of Survey Files for Examination and Certification for issuance of Tiles.

Subject Outline

Topic	Content
1. Roles of Survey Related Organizations/Departments.	The Departments of Lands and Physical Planning (DLPP) Its mandate, functions, Mission and Vision Statements, Strategies and policies to register Land and grant Title. The Office of the Surveyor General (SG) and its primary role and functions relating to Cadastral Surveying. The Department of Works and Implementation (DoWI) with specific emphasis on the mandated role and functions of the Office of the Assistant Secretary for Surveys dealing with all facets of engineering surveys.
2. The Essence and Prominence of Survey Related Professional Organizations	The PNG Surveyors Board, its core roles and functions, structure and composition, member's qualifications/credentials and the member's appointment process. Association of Surveyors of PNG (ASPNG) mandated core functions, its strategic objectives, Membership categories and requirements, Scale of Fees, Council composition and its functions, CPD programs and emerging technologies and ASPNG responsibility to protect and promote the surveying profession
3. Quintessence of Surveyors Code of Ethics and the Surveyors Creed and Cannons.	Surveyors Code of Ethics and Surveyors Creeds and Canons with clearly illustrated case studies as foundation pillars for prudent Corporate Governance/professional conduct,
4. Processes and Requirements to attain Certificate of Competence as Registered/License Surveyor.	Process and requirements for Cadetship/Article-ship under a Master Surveyor. Types and number of projects, Process and requirements to conduct projects and submission process and requirements to PNG Surveyors Boards for examination
5. The Essence and Eminence of Survey Laws and Regulations, Survey Direction (SD) and Department of Works Standard Survey Instructions (DOWSSI) including ILG and SABL.	The provisions/clauses of the SD which stipulate the conduct of different classes of Urban and Rural surveys to satisfy survey specifications Provisions and requirements of the DOWSSI for different facets of engineering surveys to satisfy survey stipulations. Process and requirements to register customary using ILG and SABL.
6. Lodgments of Survey Files for examination and certification for issuance of Title.	Statutory process and requirements for lodgment of survey files for examination, certification and issuance of Title by the Registrar of Titles. The roles and functions of the Office of Registrar of Titles and the

	collaborative processes and requirement with the Office of the SG in dealing with survey files and Titles.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Understand the roles and functions of Survey related Departments to seek professional consultations/assistance.
2. Recognize the roles and the function of the PNG Surveyors Board and ASPNG and aspire to subscribe for authentic professional membership.
3. Practice Professional and Ethical workplace conduct to achieve expected professional and survey specifications
4. Use the registration process to attain the Certificate of Competence as Registration or License Surveyor.
5. Practice the appropriate provisions in the SD for different classes of survey and satisfy the expected survey stipulations
6. Comply with the statutory process and requirements to lodge survey files to obtain land Title.

The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%. To obtain a pass grade in this subject, 50% overall must be achieved and at least 25% achieved in the final examination.

Students must also refer to the Subject Assessment Details.

Tests	**(30 %)**
Assignments	**(10%)**
Quiz	**(10%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 Tests contributing 30% towards the final grade for the subject.

Assessment 3 - **Assignment:** The assignments and group work encourage students to work as a team, to research and to communicate the research appropriately and effectively in both written and oral forms. Contributes 10% towards the final grade for the subject

Assessment 4 - **Quizzes:** There will be two quizzes each weighing 5%. Quizzes are ways to get informative feedback allowing both the instructor and the students to see where they are excelling or need more focus. Students can expect to fill in the blanks, match the columns, true-false, cross-word, levelling or diagrams, and contributes 10% towards the final grade of the subject.

Assessment 5 **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book

- Blume, K., Gibbons, K., and Gill, M. (1984). Surveyors and their Professional Liability: A Loss Prevention Manual (2nd ed.). Association of Consulting Surveyors Australia for the Institution of Surveyors Australia, N.S.W. ISBN: 9780909761127

References

- PNG Survey Direction (SD) 1990.
- Department of Works Standard Survey Instructions, 2006
- ASPNG website
- Internet Sites directed by the subject lecturer

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV423 SURVEYING PROJECT II

Course(s): Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name: Surveying Project II
Subject Code: SV423
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: **15 (**11 Practicals/Consultation)
Delivery Mode On campus
Prerequisites: SV413
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis

Student to construct/implement a prototype and carry out testing or simulation & modelling of their research project. The students must work within the confines of the research project's goals, objectives and hypotheses if appropriate and research into the intellectual aspects of the project theme. This will involve: Implementation of their research or project proposal, literature reviews, set readings and abstracting; Data Collection and Fieldwork; Data Analysis; Project Planning and Design; Dissertation write-up and an oral presentation in-person following a viva-voce examination format of the research project. The work will be undertaken with the guidance of a supervisor or supervisor(s), at least one of whom will be appointed from the academic staff of the Department. External Sponsor(s)/Supervisor(s) outside of the Department may also be involved.

Subject Topics

1. Project Introduction
2. Literature Review
3. Presentation
4. Methodology/Analysis
5. Discussion / Conclusion and Final Presentation

Subject Outline

Topic	Content
1. Project Introduction	● Background information provides an overview of the topic to be investigated. ● Appropriateness of aim, research question or testable hypothesis.
2. Literature Review	● Literature selected is appropriate to the aims of the study. ● There is critical analysis of the literature selected. ● Critical analysis is meaningful and of sufficient depth. ● Contrast & comparison of the literature is present. ● Literature review makes a clear case for the research question/ hypothesis, etc.
3. Progress Presentation	● Assess validity or progress report through formal presentation
4. Methodology/Analysis	● Research method is justified ● Appropriate use of materials or equipment. ● Accessibility of equipment. ● Comprehensive description of test procedure/ methodology. ● Quantifying of resource requirement. ● Description of an appropriate pilot study. ● Justification of chosen method(s) of data analysis. ● Outcome measure(s), including levels of measurement.
5. Discussion/ Conclusion and final presentation	● Indication of study limitations. ● Potential impact of study on wider community discussed. ● Appropriate summary of the main research project. ● Final Proposal Presentation

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Develop the student's self-confidence in handling technical problems and or situation in Geographic Information and Mapping Sciences.

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2. Develop in the student those attitudes and personal skills necessary to 'get the job done' within a specified time and resource constraints which includes documentation to an appropriate professional standard
3. Demonstrate the integration of all section of the student's formal education and bring them to bear on a substantial task.
4. Provide the students with opportunities to innovate by means of original design, analytical, experimental or research work and hence to demonstrate ability to contribute to the disciplines of spatial sciences at a high level.
5. Provide experience in the presentation of technical work in the form of an academic dissertation.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous, meaning there is no Final examination.

Students must also refer to the Subject Assessment Details.

Student-Lecture Consultations	**(10 %)**
Oral Presentations (Viva-Voce Examination)	**(40%)**
Assignments	**(50%)**

Assessment 1 - **Student-Lecture Consultations:** The student is required to have formal sessions with his/her supervisor(s), in order for the supervisor to assess whether the student demonstrates an intellectual grasp of the topic and understanding of the scope of the research proposal. Taking into consideration the relevant theoretical literature and the student's ability to demonstrate skills in making use of the literature and other relevant sources of information. Weighs 10% towards the final grade for the subject.

Assessment 2 - **Oral Presentations (Viva-Voce Examination):** There will be two presentations each weighing 15% and 25% respectively. The presentations must include the technical approach, literature reviewed and its contribution to the topic, the methodology and results with a work schedule. Feedback will assist the teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 3 - **Written Research Dissertation:** There will be a written research dissertation weighing 50%. It is a requirement, though; that the research dissertation is based on a well-defined and clear research question/ aim with achievable objective(s) of scholarly significance, and that the dissertation develops a theoretically and methodologically informed and evidence-based answer to that question/aim/objective(s). The word limit for the dissertation is 25,000 words of text, exclusive of appendices, footnotes, tabular material, bibliography or equivalent. The research dissertation must be proofread, edited, and technically of the high standard expected of scholarly outputs. The dissertation must be written in a coherent, formal style and forms a well-ordered whole. The dissertation must observe the conventions and practices of the chosen referencing style (any style can be used, as long as it is used consistently and correctly)

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism w which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
- The Writing Lab & The OWL at Purdue 2020, *Writing a research paper,* Purdue University, Indiana, viewed 20 January 2021, https://owl.purdue.edu/owl/general_writing/common_writing_assignments/research_papers/index.html

References

- American Psychological Association. 2010. Publication manual of the American Psychological Association, 6th ed., Washington, DC.
- *Style manual for authors, editors and printers* 2002, 6th ed., Wiley Australia.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

SV424 GEODESY II

Course(s):	Bachelor of Surveying (BSVY) (NQF Level 7)
Subject Name:	Geodesy II
Subject Code:	SV424
Duration:	13 Teaching weeks
Contact Hours:	6 Hours per week
Credit Points:	16 **(**2 Lectures + 4Tutorial)
Delivery Mode	On campus
Prerequisites:	Nil
Co-requisites:	SV414
Subject Coordinator:	TBA

Synopsis

Geodesy is the science of accurately measuring and understanding three fundamental properties of Earth: its geometric shape, its orientation in space, and its gravity field, as well as the changes of these properties with time. Development of geodetic techniques and instrumentation GPS, DORIS, Laser Ranging and other geodetic measuring tools have improved geodetic techniques dramatically. Geodetic observing systems provide significant benefit to society in a wide array of civil, research, and commercial areas, including sea level change monitoring, autonomous navigation, precision agriculture, civil surveying, earthquake monitoring, forest structural mapping and biomass estimation, and improved floodplain mapping. Relationship between the ellipsoid, the geoid and the Mean Sea Level is taught to students in a practical approach by use of Survey grade GNSS receivers where the GNSS satellite data is processed on the default WGS84 Ellipsoid surface, reduced to the Geoid and define the deviation of the Geoid from the Mean Sea Level by application of precise differential levelling. Convergence, Arc to Chord, Scale Factors and reductions from the ellipsoid surface to the Plane Topographic surface, Coordinate transformation/ conversion and from the default WGS84 GPS geodetic system to any National Geodetic system for simplicity to Surveying and Geomatics users

Understanding of the ellipsoid/spheroid surface clarifies the basic concepts of measurements along the Meridian, the Normal and the mean radii of earth from any given location anywhere on the earth's surface with reference to any geodetic system such as WGS84 or GRS80 (PNG94) and the AGD66 ellipsoidal surface measurements and computations.

Subject Topics

1. Ellipsoid Surface Coordinate transformation from UTM Grid to Geographic Latitude and Longitude.
2. Reverse from Geographic to Grid Coordinates on the same system
3. Geographic to ECEF Cartesian XYZ Coordinates on the same ellipsoid surface
4. ECEF Cartesian XYZ coordinates to Geographic Latitude, Longitude + Height on one System
5. Datum to Datum Transformation from Geographic to XYZ of both Geodetic systems.
6. Datum to Datum Transformation from ECEF Cartesian XYZ to back to Geographic Latitude, Longitude and Height on the Ellipsoid system of the target point.

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For relevance of applications, all computations are encouraged to be done on the PNG's national Geodetic Systems (PNG94/GRS80) Ellipsoid and AGD66 PNG's Old Geodetic system for Datum to Datum Transformation. WGS84/GRS80 to WGS72 to AGD66 can also be done.

Subject Outline

Topic	Content
1. Ellipsoid Surface Coordinate transformation from UTM Grid to Geographic Latitude and Longitude. (Coordinate Transformation)	Coordinate transformation from UTM Grid to ● Computing on the Properties of the Ellipsoid on the Projected Grid System: ⌊₀, CM, Zone, CM SF 0.999 6m, E', ρ,v,¬,r, m meridian, radians. Output coordinates are in the Geographic Latitude and Longitude, making sure the Zone is specified in order to sit the Longitude correct to its positional location. Vertical component (height) remains the same.

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2. Reverse from Geographic to Grid Coordinates on the same system (Coordinate Transformation)	• Reverse Coordinate transformation from Geographic Latitude, Longitude to UTM Grid Coordinates. : ✛₀, CM, Zone, CM SF 0.999 6m, E', ρ,v,❤,r. ω, and m value of the meridian for the value of N = N' + False Northing and E = E ' + False Easting
3. Geographic to ECEF Cartesian XYZ Coordinates on the same ellipsoid surface. (Coordinate Transformation)	• Coordinate transformation from Geographic Latitude, Longitude, Height to ECEF XYZ coordinates.
4. ECEF Cartesian XYZ coordinates to Geographic Latitude, Longitude + Height on one System. (Coordinate Transformation)	• Reveres Transformation form EFEC XYZ coordinates to Geographic Latitude, Longitude + Height. The coordinate format is the universal common system where at this stage Surveyors can transform to UTM system where Azimuth and distances can be computed or for the GIS the Geographic system is acceptable for their mapping platform (software) applicability.
5. Datum to Datum Transformation from Geographic to XYZ of both Geodetic systems. (Practical Application)	• Geographic to XYZ on both geodetic systems with their different Ellipsoidal parameters of (***a***) the major axis and (***f***) the Flattening. For practical applications such as for PNG on AGD66 and the PNG94 Geodetic systems at least 5 minimum common points that closely represent the true shape of a project site in order to enable a close approximation of target system when mean of the minimum 5 points to compute the mean values of X,Y,Z Cartesian Coordinates
6. Datum to Datum Transformation from ECEF Cartesian XYZ to back to Geographic Latitude, Longitude and Height on the Ellipsoid system of the target point. (Practical Application)	ΔX, ΔY, ΔZ is obtained from data sets on two different ellipsoid systems $X_2 = X_1 + \Delta X$ $Y_2 = Y_1 + \Delta Y$ $Z_2 = Z_1 + \Delta Z$ } Transform the target coordinates to Geographic Latitude, Longitude and Height on the Ellipsoid Surface.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Understand and practically perform the Coordinate transformation from Geographic to UTM Grid Coordinates and the vice versa
2. Transform Geographic Coordinates to ECEF XYZ Cartesian Coordinates and the Vice Versa
3. Simplified flow of coordinates transformation from Datum to Datum on the Geographic to XYZ Cartesian Coordinates and back to Geographic Coordinates of the Target system. UTM coordinates can be obtained from the target system from Geographic Coordinates level.
4. Understand the concepts of a geocentric global datum and local datum/s and their relationships through coordinates and datum transformations.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final internal examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(35 %)**
Assignments	**(15%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 4 tutorial tests, covering 35% of the internal assessment. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2 - **Written Assignment:** There will be two written assignments weighing 10% and 5% respectively. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. This is an

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	opportunity for students to organize calculator programming and procedures of computations on all matters of geodetic applications to surveying Feedback will assist teacher re-emphasize topics based on learners need.
Assessment 3	**Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Geocentric Datum of Australia 1994 Technical Manual, Intergovernmental Committee on Surveying & Mapping, Commonwealth of Australia Gazette No GN35, 6 September 1995;

References

- Bomford, G., Geodesy (Fourth Edition), Clarendon Press. Oxford, 1978;
- Cross, P. A., Hollwey, J. R., Small, L. G., Geodetic Appreciation (Working Paper No. 2), NELP 1981;
- Ewing, C. E. and Mitchell, M. M., Introduction to Geodesy, Elsevier, New York. Oxford, 1969;
- Torge, W., Geodesy, Walter de Gruyter, Berlin. New York, 1980.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

COURSE STRUCTURE
BACHELOR IN PROPERTY STUDIES

First Year First Semester

Code	Subject	Contact Hours	Credit
CD111	Development Practices & Sustainability	6	14
MA114	Quantitative Methods for Property Professionals	6	21
PS11	Introduction to Property Management & RE Practices	6	19
PS112	Land Tenure and Property Law	6	18
		24	**72**
First Year	**Second Semester**		
AE121	Principles of Economics	6	18
PS121	Real Estate Valuation 1	6	18
PS122	Land Admin Process	6	18
GI121	Basics of Remote Sensing, GIS and GNSS	6	15
		24	**69**

Second Year First Semester

Code	Subject	Contact Hours	Credit
PS213	Financial Management & Accounting	6	18
PS212	Professionalism & Business Ethics	6	18
PS215	Building Construction for Property Studies 1	6	18
PS211	Real Estate Valuation 2	6	15
		24	**69**
Second Year	**Second Semester**		
PS224	Building Construction for Property Studies 11	6	16
MA226	Quantitative Methods for Property Professionals 11	6	21
PS221	Real Estate Investment	6	18
PS222	Law of Land Use	6	18
		24	**73**

Third Year First Semester

Code	Subject	Contact Hours	Credit
PS311	Urban and Regional Planning Studies	6	18
PS312	Land Economics	6	18
PS313	Real Estate Valuation 3	6	15
PS314	Real Estate Development	6	18
		24	**69**
Third Year	**Second Semester**		
PS321	Property Taxation	6	18
PS322	Property Research Proposal	6	16
PS323	Social Mapping Studies & Field Camp	6	16
PS324	Real Estate Valuation 4	6	17
		24	**67**

Fourth Year First Semester

Code	Subject	Contact Hours	Credit
PS411	Professional Work Experience	One Semester	xx
Fourth Year	**Second Semester**		
PS421	Land Policy Theory and Reform	6	18
PS422	Property Research Dissertation	6	18
PS423	Corporate Real Estate Management	6	17
PS424	Real Estate Valuation 5	6	17
		24	**70**

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Graduate Statement (GS)
The graduates will have in-depth knowledge of all aspects of property management, land administration, valuation of real properties, real estate planning and development. They will have skills in the relevant state of the art software in property development, management, valuation, research and development of entrepreneurial skills to transform them into competent property professionals on par with national and international standards.

Course Learning Outcomes (CLOs)
On completion of the course the student will:

CLO1	Recognise the different land tenure systems, their nature, and the application of property law concepts and principles in dealing with these different systems.
CLO2	Design and analyse policies, processes and procedures of land administration, land acquisition, land investigation, land disputes and land dispute settlement in Papua New Guinea and the South Pacific Region for cost-effective participation in the process.
CLO3	Comprehend knowledge of contemporary land issues, land reform and land dispute settlement, due to changing scenarios, and the ability to design appropriate policies for sustainable development in PNG and South Pacific.
CLO4	Integrate and apply the knowledge of conventional valuation principles, use of computer aided property valuation, development and investment appraisal software, and methods in valuing freehold and terminable property interests in rural, urban and specialised properties and produce professionally acceptable valuation reports for all purposes.
CLO5	Apply the knowledge of business and financial analysis techniques, property and socio-economic data, market trends and forecasting in property investment, as well as feasibility analysis for new or existing property investments at an appropriate level of professional competence.
CLO6	Demonstrate and understand the principles of property taxation, property tax legislations and systems, and provide analytical views on tax systems and regimes in PNG and the South Pacific Region.
CLO7	Undertake market research, physical inspection of bare land and other types of real property, data collection and analysis, and prepare professionally acceptable report for appropriate purposes.
CLO8	Recognise the various corporate real estate management techniques and principles, and attributes of a good corporate real estate manager, and then apply standard space planning, management and benchmarking skills for optimal returns.
CLO9	Apply and integrate the various urban and regional planning and land economic theories with contemporary land development and land management scenarios for purposes of sustainable improvement, growth and expansion of urban and regional centres in PNG and the South Pacific Region.
CL10	Understand and apply professionalism and ethical responsibility to all property related dealings.

SUBJECT DETAILS: PROPERTY STUDIES
FIRST YEAR
PS111 INTRODUCTION TO PROPERTY MANAGEMENT AND REAL ESTATE PRACTICE

Course(s):	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name:	Introduction to Property Management and Real Estate Practices
Subject Code:	PS111
Duration:	13 teaching weeks
Contact Hours:	6 hours per week
Credit Points:	19 (4 Lectures + 0 Tutorials + 2 Practicals)
Delivery Mode:	On campus
Prerequisites:	Nil
Co requisites:	Nil
Subject Coordinator:	TBA

Synopsis

The subject provides students with the opportunity to study the general principles of property management, the different estates and management principles in managing these estates, the different roles and responsibility of a property manager and the objectives of property investment and its linkage to property management and management principles of managing a real estate agency.

Subject Topics

1. Urban estates;
2. Theory and current scope of urban real estates and the management of urban estates;
3. Principles of Marketing and Sales of property;
4. Principles of Salesmanship and Roles and responsibilities of a property manager;
5. Property Investment and Aims of property ownership;
6. Starting up a real estate practice or real estate agency.

Subject Outline

Topics	**Contents**
1. Urban estates	● Introduction: Definitions of Key Property Management Terms ● What is Real Estate? ● What is Real Property? ● What is Personal Property? ● What is Property Management? ● Development growth and types of urban estates ● The nature and the different characteristics of the urban real estates in the country and the Pacific.
2. Theory and current scope of urban real estates and the management of urban estates.	● The theory of urban real estates and the scope of the urban estates, ● The term real estate used in three different ways, ● Real estate values are determined by interactions of three sectors, ● What is public estate? ● What is private estate? ● Difference between public and private estates, ● Public estates in PNG and the issues in PNG, ● Private estates in PNG and the issues in PNG.
3. Principles of Marketing and Sales of property	● The various principles of marketing. ● The segmentation of markets, targeting and promotions involved in marketing; Market Plan, Market Research, ● Buyer Behaviour; Sales Methods, Property Listings, Sales Procedure, Settlement Procedure

4. Principles of Salesmanship and Roles and responsibilities of a property manager.	● Investment in general, ● Property Investments and the pros and cons of real estate investments, ● Features of property investment and investment risks involved, ● The various types of property ownerships-Individual ownership, co-ownership and contract by rights, the process and mechanics of ownership.
5. Property Investment and Aims of property ownership.	● Investment in general, ● Property Investments and the pros and cons of real estate investments, ● Features of property investment and investment risks involved, ● The various types of property ownerships-Individual ownership, co-ownership and contract by rights, the process and mechanics of ownership.
6. Starting up a real estate practice or real estate agency.	● The legal, institutional and functional aspects of real estate practice, ● Feasibility of starting a real estate agency practice, ● Site possibilities or areas and barriers of a real estate office, ● Real estate office set up and management.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate understanding of the general principles of property management;
2. Identify the different estates and apply the correct management principles in managing them;
3. Understand the marketing principles and strategies and tactics in marketing and the methods and sales of properties;
4. Demonstrate an understanding of the qualities of a good salesmen/women and the roles and responsibilities of a property manager including professional ethics;
5. Understand property investment and the various types of property ownership;
6. Demonstrate an understanding of appropriate general management principles to manage a real estate agency effectively within a proper legal, institutional and functional framework and be knowledgeable on the possibilities of real estate office sites and its set up.

Assessment Tasks and Weightings
To obtain a pass grade in this Subject 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous weighs 50%.

Students must also refer to the Subject Assessment Details.

Assignments	**20%**
Quiz	**10%**
Test	**20%**
Final Examination	**50%**

Assessment 1.	**Assignment:** There will be two assignments (AT1, AT2) each weighing 10%
Assessment 2.	**Quiz**: There will be two quizzes (AT3, AT4) each weighing 5%
Assessment 3.	**Tests:** There will be 2 tests each weighing 10%
Assessment 4.	**Final Written Examination:** There will be a 2 hour written examination weighing 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a normal 150 hours, based on a 14-week semester with 13 weeks of teaching as the PNG National Qualification Framework.

Subject Textbook

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Macpherson, R. Functions of a Property Management Company. Coldwell Banker Macpherson Real Estate Ltd, British Columbia.

References

- Australian Property Institute (2004). *Professional Practice 2004,* 4th Edition. Australia: Australian Property Institute.
- Forlee, R. (2004). *An intelligent Guide to Australian Property Development*. Sydney: Wrightbooks, Sydney.
- Government of Western Australia Department of Commerce and Consumer Protection (2013). *Real Estate and Business Agents Trust Account Handbook December 2013*.Consumer Protection Division of the Department of Commerce. Retrieve August 19,2016 from https://www.commerce.wa.gov.au
- Greenwood, D, W. (1983) *Land Management Law.* Lae: Department of Surveying & Land Studies, Papua New Guinea University of Technology.
- Jefferies, R, L. (1991) *Urban Valuation in New Zealand Volume 1*, second edition. Wellington: The New Zealand Institute of Valuers.
- Kau, J, K. & Sirmans, C, F. (1985) *Real Estate*. New York: McGraw-Hill, Inc.
- Macpherson, R. Functions of a Property Management Company. Coldwell Banker Macpherson Real Estate Ltd, British Columbia. Retrieve October 03,2016 from www.slideshare.net/**macphersonrealestate**/**functions-of-a-property-management-comp**...
- Millington, A, F. (1988). An *Introduction to Property Valuation, (third edition)*. The Estates Gazette Limited, London.
- Office of Urbanisation (2010). *National Urbanisation Policy 2010-2030.*Port Moresby: National Library Services of Papua New Guinea.
- UN Habitat (2012). Housing, Informal Settlements and Social Issues. In O. Sarr (Ed.), *Papua New Guinea: National Urban Profile.* (pp.17-18) Kenya, UN –Habitat.
- 11 Walter, P, Yala C, Aleker, S (2016). *Improving urban planning in Papua New Guinea. Discussion Paper No. 145.* PNG National Research Institute. Port Moresby.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS112 LAND TENURE & PROPERTY LAW

Course(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Land Tenure & Property Law
Subject Code	PS112
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18(3 Lectures +3Tutorial +0 Practicals)
Delivery Mode	On Campus
Prerequisites	Nil
Co requisites	Nil

Synopsis
This subject introduces to the students the fundamental concepts and principles of land tenure arrangements practiced in the world, the pacific region whilst drawing comparisons to Papua New Guinea land tenure arrangements with regards to the challenges and factors that influence land policies, land reforms, property values, land registration systems, land rights/ownership and the relationship between

Subject Topics
1. Land
2. Land Tenure System
3. Economic, Political and Social Aspects of Land Tenure and Land Administration
4. Real Property and Non Estates, Law of fixtures and fittings and Law of encumbrances
5. Land registration systems, Concepts, principles and processes and procedures
6. Issues in changing tenure, land tenure and development and land reforms

Topics	Contents
1. Land – People Relationship and Land rights classification and categories in PNG and existing land laws in PNG and functions of Department of Land sand Physical Planning, Legal and Equitable interests in Land	● Explain land tenure and the factors influencing it to change and its relationship to people in different societies, ● Characteristics of land and its ownership, categories of land rights and existing laws ● Planning and bottom up approaches to land administration (equal participation, inclusiveness and role of civil society); land rights as part of family and clan inheritance law; social changes and its impacts in land tenures systems and land administration, social impact of informal land administration; Women rights and access to land, security of rights for children.
2. Land Tenure Systems and Challenges in the world in the World	● Understanding the concepts of the different tenure systems in the world and the challenges faced by the different tenure systems in the world and the Pacific Region in comparisons to PNG's land tenure systems.
3. Economic, Political and Social Aspects of Land Tenure and Land Administration	● Understanding the concepts of the two tenure systems with respect to political, social and economic aspect and how they operate and the contributions to economic development in the country and the region
4. Real Property and Non Estates, Law of fixtures and fittings and Law of encumbrances	● Doctrine of and tenure estates in Land, basic forms of estates, other forms of estates ● Other forms of estates such as leasehold, mortgage, joint tenant
5. Land registration systems, Land Registration System in	● Detail understanding of the Torrens land registration system and its application on both the customary land and alienated land in PNG.

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Papua New Guinea, Land registration process in PNG,	• Features of land registration, Advantages and disadvantages of land registration, processes and
6. Issues in changing tenure, land tenure and development and land reforms	• Identifying the issues of the tenure systems and finding solutions to resolving these issues. • Land development issues and solutions • Identifying suitable options to develop both tenure systems in PNG, the land reforms in the world and PNG with respect to land tenure

Subject Learning Outcomes (SLOs)

1. Demonstrate understanding of land tenure and the factors influencing land tenure and its relationships to people in different societies;
2. Demonstrate by justifying the need to register interests held in land as well as the appropriate method of land registration technique to use;
3. Demonstrate the use of appropriate land registration documents to register interests in land using the registration process;
4. Demonstrate an understanding of the issues facing land tenure and registration in Papua New Guinea and the Pacific.

Assessment Tasks and Weightings

To obtain a pass grade in this Subject 50% overall must be achieved. There is a final examination in this subject.

Students must also refer to the Subject Assessment Details.

Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Examination	**(50%)**

Assessment 1.	**Quiz:** There will be two quizzes each weighing 5%
Assessment 2.	**Test:** There will be two periodic tests each weighing 10%
Assessment 3.	**Assignment:** There will be two assignments each weighing 10%
Assessment 4.	**Semester Exam:** A 3 hour written examination (AT7) weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a normal 150 hours, based on a 14-week semester with 13 weeks of teaching as the PNG National Qualification Framework.

Subject Textbook

Crocombe, R., (1977): Land Tenure in the Pacific, University of South Pacific

References

- Crocombe, R., (1977): Land Tenure in the Pacific, University of South Pacific
- Hefferan M.J. (2013): Real Property in Australia, Foundations and Applications, Mackenzie Green Research
- James R.W (1985): Land Law and Policy in Papua New Guinea, PNG Law Reform Commission
- Larmour. P. (1991): Customary Land Tenure: Registration and Decentralisation in Papua New Guinea, Institute of Applied Social and Economic Research
- Tooher.J & Bryan D (1997): Introduction to Property Law, Australia

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

AE121 PRINCIPLES OF ECONOMICS

Course(s): Bachelor of Commerce in Applied Economics (NQF Level 7)
Subject Name: Principles of Economics
Subject Code: AE121
Duration: 13 Teaching weeks
Contact Hours: 6 Hours per week
Credit Points: 20 **(**3 Lectures + 3Tutorial)
Delivery Mode On campus
Prerequisites: Gr 12 B+
Co-requisites: Nil
Subject Co-ordinator: TBA

Synopsis

This course is an introduction to economic concepts and basic economic theory. It introduces the students to basic microeconomic and macroeconomic concepts, principles and models of economic theory. At microeconomics level, the course focuses students to the economic principles as they apply to behavioural activities of consumers and firms. Its emphasis is placed on basic economic principles involved in the determination of price, demand and supply, input and output decisions. At macroeconomics level it analyses aggregate economic activity in the national economy and its interrelationships with the rest of the world. Emphasis is placed on basic principles involved in the determination of the level of national output, the aggregate price level, and the money supply. Alternative explanations of key macroeconomic problems and relevant economic policies are compared. It equips students to use analytical techniques to hypothetical as well as real-world situations and to analyse and evaluate economic decisions and government policies at micro and macro level.

Subject Topics

1. The Science of Economics
2. Microeconomics Principles
3. Microeconomics Principles
4. International Economics Principles

Subject Outline

Topic	Content
1. The Science of Economics	● Nature and scope of Economics
2. Microeconomic Principles	● Price Theory (Supply and Demand) ● Supply-Demand Applications ● Consumer theory (Possibilities, Preferences, and consumer choices ● Firm Theory (Production and costs) ● Markets and Market structure (Perfect Competition and its limitations ● Imperfect markets and market failure
3. Macroeconomics Principles	● Macroeconomic Issues ● National Income and Output ● unemployment and Inflation ● Long Run Economic Growth and Standard of Living ● Macroeconomic Policies ● Government and fiscal policies ● Money supply and monetary policies ● Macroeconomic Policies and Determination of Aggregate Outputs ● Policy Effects and Cost Shocks in the Aggregate Supply and Aggregate Demand Model

4. International Economics Principles	• Macroeconomic Policy and International Trade • Financial Crisis, Stabilization and Deficits • Balance of Payments • Exchange Rates • International Trade, Comparative Advantage, and Protectionism

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain and demonstrate an understanding of basic microeconomic and macroeconomic concepts, principles and relationships;
2. interpret and manipulate the basic microeconomic and macroeconomic data, graphs and models;
3. analyse and apply the microeconomic and macroeconomics principles in solving hypothetical and real world economic problems;
4. analyse and evaluate how government policies affect microeconomic and macroeconomic outcomes;
5. understand and evaluate the current debates about the choice of appropriate economic policies affecting economic agents such as households, firms, government and the world.

Assessment Tasks and Weightings
The summative exam (final examination) will carry 50% and formative assessment (continuous assessment) 50%.

Students must also refer to the Subject Assessment Details.

Tests	**(34 %)**
Projects	**(16%)**
Final Examination	**(50%)**

Assessment 1 - **Project Assignment:** An individual based project evaluating the understanding of students in microeconomics concepts and principles to be completed in a period of two weeks will be given in week 3 and students to submit their completed project in week 5 of the semester. The assignment will comprise eight percent (8%) of the total percentage points.

Assessment 2 - **Test:** This is an individual closed book test to be taken in class and the test will assess the understanding and applications of basic microeconomic concepts and principles. The test will be given in week 6 and will comprise 17 % of the total percentage points.

Assessment 3 - **Project Assignment:** The second project will also be an individual based project. It will be used for evaluating the understanding of students in macroeconomics concepts and principles. The project is to be completed in a period of two weeks will be given in week 7 and students will submit the completed project in week 9 of the semester. The assignment will compose another eight percent (8%) of the total percentage points.

Assessment 4 - **Test:** This will also be an individual closed book test. It is to be taken in class and the test will be assessing the understanding of macroeconomic concepts and principles. The test will be given in week 10 and will make up another 17 % of the total percentage points.

Assessment 5 **Examination:** This examination is an individual closed book exam examining the basic understanding and application of basic microeconomics and macroeconomics. The examination will make up 50 % of the total assessments.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Case K., Fair R., S, Oster (2016). Principles of Macroeconomics, 12th edition, Pearson Education.

Relevant Unitech Policies

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It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS121: REAL ESTATE VALUATION 1

Course(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Real Estate Valuation 1
Subject Code	PS121
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 Lectures +3 Tutorial +0 Practicals)
Delivery Mode	On campus
Prerequisites	PS 121
Co requisites	Nil
Subject Coordinator	TBA

Synopsis
The subject provides students with the opportunity to study the concepts of value, property valuation and basic economic concepts together with their inter- relationships; understand how valuation and other applied land administration and property management concepts are inter-connected and assess market value of interests in simple freehold and leasehold interests using basic valuation approaches.

Subject Topics
1. History of valuation
2. Introduction to the valuation of real property
3. The nature of the profession
4. The property market
5. Factors affecting value
6. Basic concepts used in valuation
7. Basic Valuation Methods
8. Valuation process

Topics	Contents
1. History of valuation	● Global and local scene, professionalism in valuation
2. Introduction to the valuation of real property	● Definition of Valuation, definition of property, definition of real estate, definition of real property, ● Difference in real estate and real property, ● Valuation essentials, ● Data needed for valuation, ● Types of valuations
3. The nature of the profession	● Characteristics of a profession, ● Duties & legal responsibilities of valuers
4. The property market	● Market structure, Property ownership rights
5. Factors affecting value	● Inherent features, ● External features, ● Physical factors, ● Environmental Factors, ● Social Factors, ● Economic Factors

6. Basic concepts used in valuation	● Anticipation, ● Substitution, ● Highest and best use, ● Concept of value, ● Hope value, ● Cost, ● Market ● Theory of interest ● Law of diminishing return ● Bundle of rights theory, ● Depreciation, ● Replacement cost
7. Basic Valuation Methods	● Introduction, ● Basic valuation approaches- comparison approach, summation, Income approach
8. Valuation process	● Data collection, ● Comparable sales, ● Data analysis, ● Report writing

Subject Learning Outcomes (SLOs)

1. Explain the concepts of value, property valuation and basic economic concepts together with their inter- relationships; understand how valuation and other applied land administration and property management concepts are inter-connected;
2. Prepare and use sketch plans, simple drawings and maps to locate property and measure property; calculate land and floor areas from scaled plans;
3 Search and obtain information from a range of prescribed sources and be aware of others; interpret the information collected at an appropriate level of accuracy;
4 Assess market value of interests in simple freehold and leasehold interests using basic valuation approaches;
5 Demonstrate an appreciation of the nature and purpose of a valuer's education in the profession of valuation.

Assessments Tasks and Weighting

To obtain a pass grade in this Subject 50% overall must be achieved. There is a final examination in this subject.

Students must also refer to the Subject Assessment Details.

Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Examination	**(50%)**

Assignment 1- **Test:** There will be 2 tests each weighing 10%
Assignment 2- **Assignments:** There will be two assignments weighing 10% each
Assignment 3- **Quiz:** There will be two quizzes each weighing 5% assignments each
Assignment 4- **Final written examination:** There will be a 2 hour written examination weighing 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a normal 150 hours, based on a 15-week semester with 13 weeks of teaching as the PNG National Qualification Framework.

Subject Textbook

Millington, A. F. (Edition 4). (1995). An Introduction to Property Valuation. Estates Gazette, London

References

Millington, A. F. (Edition 4). (1995). An Introduction to Property Valuation. Estates Gazette, London

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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PS122: BACHELOR OF PROPERTY STUDIES (BPST) (NQF LEVEL 7)

Course(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Land Administration Process
Subject Code	PS122
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 Lectures +3 Tutorial +0 Practicals)
Delivery Mode	On campus
Prerequisites	Nil
Co requisites	Nil
Subject Coordinator	TBA

Synopsis
This course particularly emphasizes the processes and the appropriate documents used to administer land in Papua New Guinea, the primary functions of the PNG Land Board and the Department of Lands and Physical Planning and other government agencies.

Subject Topics
1. Land administration in PNG;
2. Function of Department of Lands and Physical Planning (DLPP), DLPP relationship and linkages to other government agencies in land administration.
3. Land administration process: the land administration procedure, the different forms (documents) used, what is required at each stages.
4. Land acquisition: types of land acquisition, process of acquisition;
5. Land board: membership and function, state leases, role of minister, land allocation administration of state leases.
6. Conveyance: conveyance procedure, Title registration.
7. Overview of reforms in land administration process.

Topics	Contents
1. Land administration in PNG	● Overview of Land Administration in PNG, ● Different perspectives/perceptions of land, characteristics of land & ownership in PNG, ● Landowners rights, ● Dynamic humankind to land relationship in PNG, ● Land Administration V ● Land Management, ● Benefits of good land administration, ● Four Functions of Land Administration and their relationship, ● Land Administration Context in PNG,
2. Function of Department of Lands and Physical Planning (DLPP), DLPP relationship and linkages to other government agencies in land administration.	● Department of Lands and Physical Planning Structure, ● Lands Division Structure, ● Duties & Responsibilities, ● Land Administration ● Functions and Duties, ● Mission Statement and Divisional Objectives, ● Linkage with other Divisions & Agencies,

	● Land Administration Services.
3. Land administration process: the land administration procedure, the different forms (documents) used, what is required at each stages.	● The Land Administration procedure, the different forms (documents) used, what is required at each stages.
4. Land acquisition: types of land acquisition, process of acquisition	● Types of Land Acquisition, ● Processes of Acquisition, ● Reasons and Benefits for Acquisition.
5. Land board: membership and function, state leases, role of minister, land allocation administration of state leases.	● Membership and Function, ● Powers, Duties & Leadership Codes of Land Board, ● State Leases Types, ● Leases Terms & Conditions, ● Procedures and Requirements, ● Role of Minister, ● Land Allocation ● Administration of State Leases.
6. Conveyance: conveyance procedure, Title registration.	● Property Rights & Characteristics, ● Conveyance procedure & Documentations, ● Title registration Principles, Types, Elements, Processes, Benefits & Limitations
7. Overview of reforms in land administration process.	● Contemporary Land Administration Reforms in the Lands Department Administration Processes, Way Forward.

Subject Learning Outcomes (SLOs)

1. Demonstrate an understanding of the organizational structure, functions and procedures of various sections of the main government department which administers land in Papua New Guinea;
2. Demonstrate understanding of the various land administration processes
3. Demonstrate by practicing to complete appropriate documentations in certain land dealings;
4. Demonstrate ability to communicate effectively with respective sections within the government agency which administers land and to complete specific documentations in the land administration process;
5. Demonstrate some level of professional approach to land administration work on operational and administrative matters.

Assessment Tasks and Weightings

Quiz	**15%**
Test	**20%**
Assignment	**15%**
Examination	**50%**

Assessment 1- **Periodic Quiz:** There will be three quizzes each weighing 5
Assessment 2- **Periodic Test:** There will be two written tests each weighing 10%
Assessment 3- **Major Assignments**: There will be two assignments (each weighing 7.5%
Assessment 4- **Final written examination:** There will be a 3 hour written examination weighing 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is a normal 150 hours, based on a 15-week semester with 13 weeks of teaching as the PNG National Qualification Framework.

Subject Textbook

Papua New Guinea 'Department of Lands & Physical Planning Manual'.

References

Papua New Guinea 'Department of Lands & Physical Planning Manual'.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS215: BUILDING CONSTRUCTION FOR PROPERTY STUDIES I

Course(s)	Bachelor of Construction Management (NQF Level 7)
Subject Name	Building Construction for Property Studies I
Subject Code	PS215
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 lectures + 3 tutorials + 0 practicals)
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis:
To introduce the nature and principles of management and provide an understanding of the role of management in construction.

Subject Topics
1. Describing the factors affecting the design of buildings
2. Explain the physical characteristics of building materials
3. Identify basic building elements and construction systems
4. Recognize common building defects

Topics	Content
1. Describe the factors affecting the design of buildings	● General factors affecting design of buildings in the tropics
2. Explain the physical characteristics of building materials	● Properties of timber, masonry, concrete, steel and other building materials.
3. Identify basic building elements and construction systems	● Characteristics of construction systems based on elements made from these materials
4. Recognize common building defects and describe the work of various construction trades.	● Survey of common building defects. ● Description of construction trades and scope of work covered by each trade.

Subject Learning Outcomes (SLOs)

1. Describe the factors affecting the design of buildings;
2. Explain the physical characteristics of building materials;
3. Identify basic building elements and construction systems;
4. Recognize common building defects;
5. Describe the work of various construction trades.

Assignment Tasks and Weightings
The summative exam (final examination) will carry 40% and formative assessment (continuous assessment) 60%.

Students must also refer to the Subject Assessment Details.

Assessment	**20%**
Test	**20%**
Seminar	**20%**
Final Examination	**40%**

Assessment 1 - **Assignment:** Carry out literature review on the nature of a building and the design and construction system. The assignments assessed by an assessment rubric and contributes 20% towards the final grade for the subject.

Assessment 2 – **Test:** A test is conducted to provide to the student another mode of assessment. This is to gain the students understanding of the physical characteristics of buildings. The test is assessed by

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	number of questions and their weighted marks and contributes 20% towards the final grade for the subject.
Assessment 3 -	**Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The type of defects found in buildings and the maintenance system. The seminar is assessed by an assessment rubric and contributes 20% towards the final grade for the subject.
Assessment 4 –	**Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examinations assessed by the numbers of questions and their weighted marks and contributes 40% towards the final grade for the subject.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload

The total workload for the subject for the 'average' student is nominal 150 hours, based on a 14-weeks semester with 13 weeks of teaching as per the PNG National Qualification Framework.

References

- Everett, T., Materials, Mitchell's Building Series, 5th edition, Longman Scientific and Technical, Essex.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS224: BUILDING CONSTRUCTION FOR PROPERTY STUDIES II

Course(s)	Bachelor of Construction Management (NQF Level 7)
Subject Name	Building Construction for Property Studies II
Subject Code	PS224
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	**16** (2 lectures + 4 tutorials + 0 practicals)
Delivery Mode	On campus
Prerequisites	CM213
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis:
To develop awareness of building design determinants, common building materials, building elements and construction systems and introduce various construction trade classifications.

Subject Topics

1. Building Documentation
2. Healthy Buildings
3. Building Systems 1
4. Building Systems 2

Topics	Content
1. Building Documentation	● Introduction to architectural drawings and specifications.
2. Healthy Buildings	● Review of building and health ordinances related to buildings.
3. Building Systems 1	● Introduction to hydraulic and electrical systems
4. Building Systems 2	● Introduction to telecommunication, and mechanical building service systems.

Subject Learning Outcomes (SLOs)

1. Comprehend architectural drawings and specifications;
2. Comprehend Building Specifications
3. Make reference to building and health ordinances;
4. Explain the layout and constituent parts of various types of building services.

Assessment Tasks and Weightings

Assignment	20%
Test	20%
Seminar	20%
Final Examination	40%

Assessment 1 - **Assignment:** Carry out literature review on the processes of generating building documents in design and construction stages. The assignments assessed by an assessment rubric and contributes 20% towards the final grade for the subject.

Assessment 2 - **Test:** A test is conducted to provide to the student another mode of assessment. This is to gauge the students understanding of the building and health ordinances. The test is assessed by number of questions and their weighted marks and contributes 20% towards the final grade for the subject.

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Assessment 3 - **Seminar:** The seminar presentation provides a different mode of assessment for the students. The students will be divided into manageable group size and numbers. They will gather information through literature search and other sources. They will then prepare a formal report and a presentation using power point. The various types of services needed in buildings and how they are designed and constructed are studied. The seminar is assessed by an assessment rubric and contributes 20% towards the final grade for the subject.

Assessment 4 - **Final Examination:** Final examination is given which comprise case questions to test students overall understanding of the topics. The examinations assessed by the numbers of questions and their weighted marks and contributes 40% towards the final grade for the subject.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload:
The total workload for the subject for the 'average' student is nominal 150 hours, based on a 15-weeks semester with 13 weeks of teaching as per the PNG National Qualification Framework.

References

- Everett, T., Materials, Mitchell's Building Series, 5th edition, Longman Scientific and Technical, Essex.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

MA226: QUANTITATIVE METHODS FOR PROPERTY PROFESSIONAL II

Programs	Second Year Property Studies (NQF Level 8)
Subject Name	Quantitative Methods for Property Professional II
Subject Code	MA226
Duration	One semester
Credit Points	21
Delivery Mode	On campus
Prerequisites	Grade 12 Mathematics
Co requisites	Nil
Subject Coordinator	Mathematics Teaching Staff

Synopsis

This subject is a continuation of Probability & Statistics taught at upper secondary level and its aim is to equip the students with necessary mathematical skill and techniques required and/or to be of use in Property Professional studies. As mathematics being the universal tool in solving and finding solutions to problems in any discipline of knowledge, this subject introduces techniques of statistics that seem relevant to solve problems and/or be use in the students' day to day life and at their place of work. Here the subject deals with basic concepts of statistics and probability to provide students with the basic knowledge of practical statistical procedures that they may encounter during their study here as well as in the work area.

Subject Topics

1. Probability
2. Statistics

Topic	Content
1. Probability	● Experimental probability, ● Sample space, ● Theoretical probability, ● Compound events, using tree diagrams, ● Sampling with and without replacement, ● Binomial probabilities, ● Sets & Venn diagrams, ● Laws of probability, ● Independent events. ● Probabilities using permutation and combination, ● Bayes' theorem.
2. Descriptive statistics.	● Continuous numerical data and histogram, ● Measuring centre of data, cumulative data, measuring spread of data, variance & standard deviation.
3. Statistical distributions of discrete random variables.	● Discrete random variables, ● Discrete probability distributions, ● Expectation, ● Measures of a discrete random variables, ● Binomial distribution, ● Poisson Distributions.
4. Statistical distributions of continuous random variables.	● Continuous probability & continuous functions, ● Normal distributions, ● Standard Normal Distribution (Z-distribution), ● Application of normal distribution. ● Central Limit Theorem and application to quality control, ● Correlation & Regression,

Subject Learning Outcomes (SLOs)

1. Represent statistical data using tables and diagrams, and extract and interpret information represented as tables and diagrams,
2. Analyse and design questionnaires, and understand the procedures for administering a questionnaire,
3. Show the difference between sampling and a census, and show how simple random samples can be selected,

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4. Calculate descriptive statistics for the centre and spread of data, using both raw data and data represented in tables,
5. Calculate probabilities using symmetries and relative frequencies, and apply the basic laws of probability,
6. Use the properties of the Standard Normal distribution to calculate proportions, percentiles, and probabilities associated with Normal populations, and use the Normal distribution to understand the essentials of Quality Control,
7. Calculate correlation coefficients and regression formulas,
8. Use a spreadsheet to construct statistical tables and graphs, calculate descriptive statistics, index numbers, correlations, regression equations, and time series trends and cycles.

Assessment Tasks and Weightings
Students must attain at least 50% overall in the subject. Formative assessments will contribute 50% and a summative final written examination will contribute 50% to overall assessments

Students must also refer to the Subject Assessment Details.

Quiz	10%
Test	30%
Assignment	10%
Final Examination	50%

Assessment 1- **Quiz**: There will be 3 quiz, two weighing 3% and one weighing 4%.
Assessment 2- **Assignments:** There will be 3 assignments, two weighing 3% and one weighing 4%.
Assessment 3- **Tests:** There will be 3 tests, all weighing 10%.
Assessment 4- **Final written Examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text book
Mathematics Department modules

References
- Walpole R.E., Introduction to Statistics 3rd ed (Macmillan, 1982)
- Cryer, D.C. and Miller, R.B., Statistics for Business: Data Analysis and Modelling (PWS Kent, 1991)

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS211: REAL ESTATE VALUATION 2

Courses(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Real Estate Valuation 2
Subject Code	PS211
Duration	13 teaching weeks / one semester
Contact hours	6 hours per week
Credit Points	15 (2 lectures + 2 Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites	PS121
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis

This subject builds on from the subject PS122 Real Estate Valuation 1 and helps students to be grounded well on the principles, methods and practice of property valuation. The course revisits economic principles underpinning the urban land use and property valuation; valuation strategies and processes, value and market value, productivity and most probable use; traditional approaches of comparison, income and cost approaches; rural valuation methods; national and international valuation standards; contemporary valuation practice.

Subject Topics

1. Valuation methods applicable for urban real properties
2. Valuation methods applicable for rural real properties
3. General concepts and principles of valuation
4. Valuation process and report writing
5. Factors affecting values of real property
6. Legal requirements and registration of valuers

Topics	**Contents**
1. Valuation methods applicable for urban real properties	● Market Approach: sales transaction method; ● Cost approach: summation method, quantity surveyor's method, depreciation methods; ● Income Approach: direct capitalization method, discount cash flow method, hypothetical development method
2. Valuation methods applicable for rural real properties and depreciation methods	● Planted hectare method, cleared hectare, productivity method, unit of production (dry sheep equivalent) method ● Diminishing in Value Methods, Straight Line method and Sum of Digits Methods
3. General concepts and principles of valuation	● General valuation concepts and principles that guide the theory and practice of valuation; ● Value, value-in-use and value-in-exchange, demand, supply, willing-buyer & willing-seller, change, cost-versus-value, substitution, anticipation,
4. Valuation process and reporting	● Pre-inspection, field inspection, types of valuation reports, outline, content, quality and standard
5. Factors affecting values of real property	● General factors affecting values of properties in rural and urban properties
6. Legal requirements and registration of valuers	● Valuation Act 1967, qualification

Subject Learning Outcomes (SLOs)

1. Demonstrate an understanding of the concepts, principles and methods of valuation and practice in rural and urban properties.
2. Demonstrate understanding of the process and procedure in the registration of valuers and the requirements of the Valuers Registration Board of Papua New Guinea.
3. Justify the choice of the appropriate method of valuation to value a particular a class of real property and value that property with some level of competency.

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4. Prepare and present valuation report of high standard and professionalism in compliance with local and international standards.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Test	**20%**
Assignment	**30%**
Final Examination	**50%**

Assessment 1- **Assignment:** There will be three assignments each weighing 10%
Assessment 2- **Tests:** There will be 2 tests each weighing 10%
Assessment 3- **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
API (2014), The Valuation of Real Estate, 2nd Edn., (Australian Edition), Australian Property Institute, Canbera

References
A.F. Millington (2000), An introduction to property valuation,5th Edition, Estates Gazette, London

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS212: PROFESSIONALISM AND BUSINESS ETHICS

Course Bachelor of Property Studies (NQF Level 7)
Subject Name Professionalism and Business Ethics
Subject Code PS212
Duration 13 teaching weeks
Contact hours 6 hours per week

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Credit Points: 18 (3 lectures + 3 tutorials + 0 practicals)
Delivery Mode: On campus
Prerequisites: Nil
Co-requisites: Nil
Subject Coordinator: TBA

Synopsis
This course is aimed at familiarising students with the concepts of professional Code of Conduct and Business Ethics in the management of business organisations and to help them understand how organisational objectives are achieved. It is also envisaged that students can demonstrate knowledge of preparing and documenting organisational activities in a professional manner using appropriate structures, forms, templates and reports.

Subject Topics
1. Real Property Professional Code of Conduct & Code of Ethics
2. Professional Attributes
3. Employee and Client Management
4. Business Practice and Safety
5. Professional Duties

Topics	Contents
1. Property Profession Code of Conduct & Ethics	● Professional & Personal Conduct, ● Conflict of Interest, ● Client Relationship.
2. Professional Attributes	● Accountability, ● Transparency, ● Good Governance, & ● Negotiation Skills.
3. Employee & Client Management	● Staff Recruitment & Training, ● Personal Management, ● Employer-Employee Rights & Obligations, ● Customer Service & Quality Management.
4. Business Practice, Regulations & Safety	● Business Regulations & Business Registration, ● Insurance, ● Professional Fees, ● Taxation and Government Fees ● Work Place Health & Safety.
5. Professional Duties	● Arbitration & Expert Witness, ● Starting Up A Small Business In Real Estate, ● Office Management, ● Tender Process & Bids, ● Auctions, ● Management of Trust Accounts, ● Management of Records & Accounting, ● Business Cash Flows, ● Business Plans, ● Strategic Management, ● Engaged Employees

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Discuss the concepts of professionalism and business ethics in the Property profession perspective;
2. Explain the significance of Professional attributes in a working environment;
3. Explain the essence of employee – employer working relationship in staff recruitment and motivation to produce outcomes and provide best customer service to clients in the organisation;
4. Discuss the importance of organisational and business practices, regulations, health and safety requirements;
5. Demonstrate ability to express and apply certain skills in professional manner in given scenarios.

Assessment Tasks and Weightings

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To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Quiz	**10%**
Test	**20%**
Assignment	**20%**
Final Examination	**50%**

Assessment 1- **Written Assignment:** There will be two written assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to the Internet and other study materials with proper referencing. Feedback will enable the teacher to re-emphasise topics based on learners' needs.

Assessment 2- **Quiz:** There will be two quizzes each weighing 5%. The Quizzes are to assess the students' learning abilities in the lessons learnt. The Quiz takes the form of filling the blanks, matching the columns, true-false, cross-word, etc. Feedback will assist the teacher in re-emphasising topics based on learners' need

Assessment 3- **Test:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; develop plans, diagrams and flowcharts. Feedback will assist the teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4- **Final Written Examination:** A 3-hour written examination weighs 50%. Final exam will be summative in nature, emphasising all topics covered during the semester. Students can expect questions and diagrams. Elaborating answers with appropriate examples, diagrams are highly encouraged. Final exam is a tool to evaluate students effectively as well as to understand their strengths and weaknesses, which in turn will assist in future course reviews.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Stapleton, J. (1986), Estate Management, The Estate Gazette, London.

References
Relevant Regulations / Code of Ethics, e.g. PNGIVLA, RICS (Global), Australia/New Zealand, RECO-Canada and IVSC Standards

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS221: REAL ESTATE INVESTMENT

Courses(s)	Bachelors of Property Studies (BPST) (NQF Level 7)
Subject Name	Real Estate Investment

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Subject Code	PS221
Duration	13 teaching weeks
Contact hours	6 hours per week
Credit Points	18 (3 lectures + 3 tutorials + 0 practicals)
Delivery Mode	On campus
Prerequisites	PS211
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis
The subject entails understanding various financial investment techniques in real estate to making optimistic and focused financial decisions in real estate investment with the objective of maximising returns and opportunities and minimising risks.

Subject Topics
1. Financial Institutions and Investment
2. Property Investment & Risks
3. Mathematics of Finance
4. Financial Ratios and Analysis of Financial Statements
5. Capital Budgeting Techniques

Topics	Contents
1. Financial Institutions and Investment	● Types & requirements of financial institutions, ● Investment & financial markets, ● Sources of finance & financial instruments, ● Policies & procedures to loans ● Monitoring performances,
2. Property Investment & Risks	● Introduction to Property Investment ● Investment Opportunities, ● Speculation, ● Uncertainty and Risks, ● Risk and Return Profile, ● Investment and Financial Markets;
3. Mathematics of Finance	● Present and Future Value of Single and Series of Payments, ● Overview of Investment Analysis; ● Valuation versus Financial Analysis; ● Rates of Returns: Capitalisation Rates, Initial Yields, Equity Returns, Capital Growth.
4. Financial Ratios	● Financial Ratios and their Significance in analyzing Financial Statements;
5. Capital Budgeting Techniques	● Payback period, ● Accounting Rate of Return, ● Net Present Value, ● Net Terminal Value, ● Internal Rate of Return, ● Modified Internal Rate of Return, ● Profitability Index

Subject Learning Outcomes (SLOs)
Identify sources of finance and lending institutions with their requirements.
: Explain the time value of money concepts and their relevance to real estate investment decision making.
Analyse and interpret initial yields, equity return, capitalisation rates, potential for capital growth and risks and show the relationship between these returns with respect to real estate investment
Analyse and interpret financial ratios using financial statements in real estate investment analysis
Apply and interpret the outcome of different capital budgeting techniques with respect to real estate investment analysis;

Assignment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

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Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Final Examination	**(50%)**

Assessment 1 - **Tests:** There will be 2 tests each weighing 10%

Assessment 2 - **Assignment:** There will be two assignments each weighing 10%

Assessment 3 - **Quizzes:** There will be two quizzes each weighing 5%

Assessment 4 - **Final written examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/?q=unitech/policies

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14 week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text

- Thomas R. Robinson, Elaine Henry, et al., International Financial Statement Analysis, 3rd edn.,2015, FB & C Ltd. ISBN-10: 1118999479 ISBN-13: 978-1118999479.

References

- Millington A., An Introducing Property Valuation., 5th edn. 2013, Estate Gazette. ISBN-10: 13846144X | ISBN-13: 978-1138461444.
- 2. Sims S., and Reed R., Property Development., 6th edn. 2014, Routledge. ISBN-10:0415825180 | ISBN-13:978-0415825184.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS222: LAW OF LAND USE

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Courses(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Law of Land Use
Subject Code	PS222
Duration	13 teaching weeks
Contact hours	6 hours per week
Credit Points	18(3 lectures + 3 tutorials + 0 practicals)
Delivery Mode	On campus
Prerequisites	PS 112
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis

This subject strengthens the students' knowledge and skills in addressing and recognising the different laws of land use stipulated in the PNG Constitution, relevant Acts, Precedents and the underlying Laws. It provides the students with an overarching introduction to land tenure systems, their nature, and the application of land use law, concepts and principles in dealing with these different systems on customary land, leasehold and freehold land for sustainable development. Furthermore, it provides the students with acceptable standards of dealing with processes, procedures and mechanism in administering land and its different uses.

Subject Topics

1. Introduction to Laws of Land Use Controls and its Applications to PNG.
2. Customary Land Laws and Land Development in PNG.
3. Laws of Land Use and Application on Extractive Industries in PNG.
4. Laws of Land use to Land/Resources Conservation and Acquisition.
5. PNG Land Act 1996 and other Resource Acts to Customary Land Dealings.
6. Contemporary Unalienated Land Issues relating to Land Use Dealings and Policies in PNG.

Topics	Contents
1. Introduction to Laws of Land Use Controls and its Applications in PNG.	● Different sources of law in PNG regarding land use, regulations and control of customary land, freehold and leasehold in relation to the Constitution, Acts, Laws, Precedents and the underlying Laws.
2. Customary Land Laws and Reform and Land Development in PNG.	● Fundamental concepts and categories, meaning of the expression 'Land'- Customary Law and General Law, alienated and unalienated land, customary land law reforming PNG: law, economics and property rights in a traditional culture.
3. Laws of Land Use. Its processes and Application on Extractive Industries in PNG.	● Different leases and tenements involve in the extractive industries, compensation to landholders, ● Sustainability of landowners, ● Legislation and policy impacting on extractive industries, resettlement and infrastructure development.
4. Laws of Land use to Land/Resources Sectors in Acquisition and Conservation.	● Five pillars protecting the use of forestry, natural resources and conservation in PNG, ● Forestry laws regulating the industry, ● Advantages and disadvantages of SABL and Lease-Lease back on plantations, ● Land Redistribution Act 1974.
5. PNG Land Act 1996 and other Resource Acts to Customary Land Dealings.	● Land Act 1996 on acquisition of customary land, its processes, the different leases, covenants, licences and dealings in regards to land use, how well Land Act integrated or complementary to other Acts.
6. Contemporary Un-alienated Land Issues relating to Land Use Dealings and Policies in PNG.	● Status quo policy, ● land transformation policy, ● Improvement policy, ● Current issues dealing with registration of group titles and policies, processes, procedures and mechanism. ● ILG Amended Act 2009.

Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

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1. Identify and explain the different sources of Laws of Land use, Regulations, Legislative Provisions and its Application in PNG.
2. Discuss the Customary Land Laws and Reform and Land Development in PNG.
3. Explain the Laws of Land Use Laws, its Processes and Application on Extractive Industries in PNG.
4. Distinguish the Laws of Land use to Land and Different Resource Sectors in Acquisition and Conservation.
5. Compare and Assess PNG Land Act 1996 to other Land / Resource Acts to Customary Land Dealings.
6. Appraise the Contemporary Un-alienated Land Issues relating to Land Use Dealings and Policies in PNG.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Final Examination	**(50%)**

Assessment 1- **Assignment:** There will be two assignments each weighing 10%

Assessment 2- **Quiz:** There will be two quizzes each weighing 5%

Assessment 3- **Tests:** There will be 2 tests each weighing 10%

Assessment 4- **Final Examination:** A 3 hour written examination weighs 50%

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/?q=unitech/policies

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
- Edward, R. (2017). Fundamentals of Property Law, 7th Edition, Foundation Press.

References

- Christopher S., (2016), The Law of Property (Concepts and Insights)., 2nd ed., Foundation Press. ISBN-10:1634592999 | ISBN-13:978-1634592994.

- Denyer – Green B., (2018), Compulsory Purchase and Compensation, 11th ed., Taylor & Francis. ISBN-10: 1138617768, ISBN-13: 978-1138617766.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS 311: URBAN AND REGIONAL PLANNING STUDIES

Course Bachelor of Property Studies (NQF Level 7)
Subject Name Urban and Regional Planning Studies
Subject Code PS 311
Duration 13 teaching weeks
Contact Hours 6 hours per week
Credit Points 18 (3 Lectures + 3 Tutorials + 0 Practical)
Delivery Mode On campus
Prerequisites Nil
Co-requisites Nil
Subject Coordinator TBA

Synopsis
This subject introduces students to the historical background of human settlements, origins of planning theories and reasons for planning, which they can relate to and use for explaining the importance of developing good urban and regional plans. It also introduces to students the need for growth and expansion of existing urban and regional centres relating to impacts of urbanisation.

Subject Topics
1. Introduction, History and Overview of human settlements in general and in Papua New Guinea
2. Urbanisation and its Impacts in PNG and globally
3. Urban and Regional Economics
4. Principles of Urban & Regional Planning Systems; Land Subdivision and Types of Land-use Plans
5. Land Development, Operation and Control of Development
6. Information and Planning for Infrastructure: Types of Data

Topics	Contents
1. Introduction, History and Overview of human settlements in general and in Papua New Guinea	Why study urban and regional planning; what has it got to do with Property Studies? Overview of human settlements; types and patterns of human settlements, social, economic and environmental aspects of human settlements
2. Urbanisation and its Impacts in PNG and globally	What is urbanisation? Causes of urbanisation; effects of urbanisation (economic, political, social, and environmental), benefits and adverse effects of urbanisation; challenges; rural and urban migration, factors of rural-urban migration, push and pull factors; What is built environment? Aspects of built environment in urban and rural PNG, Who is responsible for the built environment? Challenges of the built environment in the 21st century
3. Urban and Regional Economics	What is urban economics? Themes of urban economics-market forces, land use, urban transportation. Urban problems and public policy, local gov't expenditure and taxes; regions/provinces and regional economics.
4. Principles of Urban & Regional Planning Systems; Land Subdivision and Types of Land use Plans	Definitions and Principles of Urban and Regional Planning; Role of Planners; Levels of Planning; Zoning, Land use plans; Strategic plans, inner-city development plans, Land subdivision process; Strategic plans; Principles of subdivision. Consolidation, land use; development and zoning of land.
5. Land Development, Operation and Control of Development	Land development process; planning and development approval process in PNG; Why development control?
6. Information and Planning for Infrastructure: Types of Data	Importance of infrastructure in cities; Information and data; Surveys and data collection for infrastructure planning; Types of infrastructure; Data for infrastructure planning; Baseline studies; economic, political, legal, social, environmental, and infrastructure; planning for needs of people; data collection, analysis and report writing for land use planning purposes

Subject Learning Outcomes (SLOs)

1. Demonstrate an understanding of the principles of urban and regional planning in developing good human settlement plans;
2. Explain and relate the growth of settlements and their characteristics in urban centres to the urban growth theories and structures;
3. Demonstrate an understanding of the use of the different urban and regional planning instruments and regulatory controls and their use in the land development process in Papua New Guinea; and
4. Demonstrate an appreciation of urban and regional planning as a tool for developing better quality of life for urban and regional development centres.

Assessment Tasks and Weightings

To obtain a pass grade in this subject, at least 50% overall must be achieved. Students are assessed through a continuous assessment (CA) approach with no summative end-of-semester examination. However, various assessments must be integrated and balanced between Tutorials, Quizzes, Tests and Assignments of different weightings culminating in 100%.

Quiz	**10%**
Test	**20%**
Assignment	**20%**
Final Examination	**50%**

Assessment 1- **Written Assignment**: There will be two written/practical assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist the teacher to re-emphasize topics based on learners' needs.

Assessment 2- **Quiz:** There will be two quizzes each weighing 5%. The Quizzes are to examine the students' learning abilities in the lessons learnt. The Quiz takes the form of filling the blanks, match the columns, true-false, crossword, etc. Feedback will assist teacher to re-emphasize topics based on learners' needs.

Assessment 3- **Test:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; develop plans, diagrams and flowcharts. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of teaching and learning the subject.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/main http://asix.unitech.ac.pg/apps/pnguot/sites/default/files/images/AcademicIntegrityPolicy.pdf

Student Workload

The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Texts

Australian Property Institute, (1999), Professional Practice, API, Australia.

References

Relevant Regulations / Code of Ethics, e.g. PNGIVLA, RICS, Australia/New Zealand and RECO-Canada, IVSC Standards

Relevant Unitech Policies

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PS312: LAND ECONOMICS

Course	Bachelor of Property Studies (NQF Level 7)
Subject Name	Land Economics
Subject Code	PS312
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 Lectures + 3 Tutorial + 0 Practical)
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis

This course emphasizes the importance of making better locational decisions by land developers or investors in the property market. It deliberates the essence of sound investment decisions by considering factors of economic, social, and demography influence and political interventions amongst government's policies and urban development regulations in the real estate (property) market. It also envisaged certain urban growth and land use theories/models to give students the opportunity to prove and discuss their practical aspects to the existing concept of urban land development in the various urban centres in Papua New Guinea.

Subject Topics

1. Introduction to Land Economics
2. Urban Growth and Land Use Theories
3. Urbanisation
4. Real Estate Property Market and Development
5. International Property Market
6. Government, Economic and Development Policies

Topics	Contents
1. Introduction to Land Economics	● Land in Economics; ● Land Defined, Characteristics, functions, importance, and Productivity of Land, Scope and Concept; Land Economics & Land Use Planning, Land Economics & Valuation, Land Economics & Land Administration.
2. Urban Growth & Land Use Theories/Models	● Location Theory; ● Von Thunen Theory/Model, ● William Alonso Theory of Urban Rents, ● Patterns of Urban Growth Theories; ● Ernerst Burgess Theory on Concentric Zone, ● Radial Development Theory, ● Sector Theory, ● Harris & Ullman Multiple Nuclei Theory; ● Urban Growth Theories; ● Economic Base Theory, ● Input-Output Analysis, ● Keynesian Model, ● Central Place Theory, ● Rank Size Rule.
3. Urbanisation	● Urban Growth & Uses; ● Urban Growth, Stages of Urban Development, ● Characteristics of Urban Centres, ● Urban Change & Regeneration, ● Urbanization; Concepts & Meanings, Causes & Effects; What is a City?;
4. Real Estate Property Market and Development	● Economics of Real Estate Development; ● Main Participants, Real Estate Market, Demand for Properties, Production Agents, RE Market Cycle, Types of Markets, RE Market Participants, RE Property Market & Perfect Competitive Market, Urban Development & Planning; Land in the Path of Urban Growth, RE Development Process, Property Types & Selection.

5. International Property Market	● Various Aspects of Property; ● Physical, Legal, Economic, Property Cycle; ● External Influence on Property market, Policy Instruments of Property Market.
6. Government, Economic and Development Policies	● Government Intervention Policies in the Market; ● Effects of Intervention, The Need to Intervene, Government Failure, Government helping Market Failure, Tax; ● Effects of taxes on Price & Quantity, Who Pays, Tax Incidence, Subsidy & Effects, Price Ceiling & its Effects/Benefits, Black Markets, Minimum & Maximum Prices.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate understanding of the importance of economics, social, demographic, political reasons for locational decisions in urban areas for growth and expansion;
2. Express ability to explain the causes of urban land use changes and the frame work within which urban land development are made;
3. Demonstrate ability to compare land use changes in major urban areas in PNG to the various Land Use Development Theories and Models;
4. Explain the significance roles of local and international Property market in land use decisions;
5. Discuss the various intervention policies from different stakeholders locally and internationally that have contributed in the making locational decisions.

Assessment Tasks Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Final Examination	**(50%)**

Assessment 1- **Written Assignment**: There will be two written assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 2- **Quiz:** There will be two quizzes each weighing 5%. The Quizzes are to finding the students learning abilities on the lessons learnt. The Quiz takes the form of filling the blanks; match the columns, true-false, cross-word, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3- **Test:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; develop plans, diagrams and flowcharts. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4- **Final written examination**: A 3 hour written examination weighs 50%. Final exam will be summative in nature, emphasizing on all topics covered during the semester. Students can expect questions and diagrams. Elaborating answers with appropriate examples, diagrams are highly encouraged. Final exam is a tool to evaluate students effectively as well as to understand their strengths and weaknesses, which in turn will assist in future courses review.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/main
http://asix.unitech.ac.pg/apps/pnguot/sites/default/files/images/AcademicIntegrityPolicy.pdf

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Balchin P.N. "Urban Land Economic Policy". Macmillan, London 1995.

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References
Mathew E. and Jerome R. “Readings in Urban Economics”, Macmillan USA, 1972.

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS313: REAL ESTATE VALUATION 3

Courses(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Real Estate Valuation 3
Subject Code	PS313
Duration	13 teaching weeks
Contact hours	6 hours per week
Credit Points	15(2 lectures + 2 Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites	PS121 and PS211
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis
This subject builds on the subjects PS122 Real Estate Valuation 1 and PS211 Real Estate Valuation 2. The subject provides students the knowledge, skills and appropriate ability to undertake valuation of a range of income producing and investment properties. This subject is designed to foster a deep understanding of theory and practice applied by industry to the analysis of income producing and investment properties. Students develop a strong theoretical and practical understanding of the established industry-based analysis, informing key decisions relating to property investment value and performance measurement.

Subject Topics
1. Methods of investment property valuation
2. Mathematics of valuation reviews
3. Investment valuation
4. Capitalisation rates, Discount rates and Risk analysis
5. Real estate cycles
6. Rental arrangements

Topics	Contents
1. Valuation of investment properties	● Types of investment properties, understanding of the property market process, principles and practice of valuation of investment properties Market approach, income approach, cost approach, profits method, DCF approach to valuation
2. Mathematics of valuation reviews	● Time value of money, valuation tables: future value, future value per annum, present value, present value per annum, amortisation, sinking fund,
3. Investment property valuation, process and application	● Interests in real estate, valuation of interests, valuation of varying incomes, valuation of terminating incomes, investment valuation process and application and reporting
4. Capitalisation rates, Discount rates and risk analysis	● Choice and selection of capitalisation rates and discount rates, Modern risks analysis and investment valuation
5. Real estate cycles	● Real estate cycles and implication for valuation
6. Rental arrangements	● Current rent reviews, lease incentives and inconsideration in valuation; Modern lease structure and market rents;

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate an understanding of the property market process, principles and practice of valuation of investment properties.
2. Produce a series of valuation reports on the valuation of investment properties
3. Identify impacts of lease and lease incentives in the valuation of a range of investment properties.
4. Demonstrate an understanding of the implications of risks and real estate cycles on investment properties and their valuation.

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5. Demonstrate an understanding of the economic reasons for the choice of capitalisation and discount rates for valuation and their use in the valuation of investment properties.

Assessment Tasks Weighting

To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Quiz	**(5%)**
Test	**(20%)**
Practical	**(15%)**
Assignment	**(10%)**
Final Examination	**(50%)**

Assessment 1- **Written Assignment:** There will be one written assignment (short researchable paper) on a relevant topical issue in topics 1, 2and 3 weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 2- **Practical Assignment:** There will be one practical assignment weighing 15%. Students will be required to produce a valuation report with the objective of assessing the investment value of a simulated case of investment property in Lae city. The practical assignment will require investigation of facts and collation of valuation evidence to complete the valuation report accordingly

Assessment 3- **Quiz:** There will be one quiz weighing 5%. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, labelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 4- **Final written examination:** A 3 hour written examination weighing 50%. Final exam will be summative in nature, emphasizing on all topics covered during the semester. In general, some optional questions will be provided accommodating learning gaps. Students can expect questions, diagrams, numeric problems. Elaborating answers with appropriate examples, diagrams are highly encouraged.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Millington, A.F., (1995), An introduction to the property valuation, 4th edition, Estates Gazette, London.

References

- Baum, A., Mackmin, D., Hunnington, N., (1997), The income approach to valuation, 4th edition, International Thomson Business Press, London
- Millington, A.F., (2000), An introduction to property valuation,5th edition, Estates Gazette, London
- Whipple, R. T. M., (2006), Property valuation and analysis, 2nd edition, Law Book Co., Sydney

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS 314: REAL ESTATE DEVELOPMENT

Courses(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Real Estate Development
Subject Code	PS 314
Duration	13 teaching weeks
Contact hours	6 hours per week
Credit Points	18(3 lectures +2 Tutorial +1 Practicals)
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis
This subject deals with an overview of a sustainable real estate development process from inception to disposal, including occupancy and management, from the socio-economic, cultural and political perspective. It includes Development Appraisal/Viability and Feasibility analysis, Development process, project funding calculations (loan and equity) and project management services.

Subject Topics
1. Introduction: the development process and its economic context
2. The contemporary real estate development process: members of the development team
3. Development finance, appraisal and risks
4. Construction and Project Management
5. Market Research
6. Promotion and Selling

Topics	Contents
1. Introduction: the development process and its economic context	● Speculative and non-speculative real estate projects. ● The significance of feasibility and viability reports and their practical examples of them to PNG economy. ● Detail structure of the feasibility and viability reports.
2. The contemporary real estate development process: members of the development team	● Stages and tasks of the typical development processes (Development matrix). ● Members of a typical development team and their responsibilities. Including typical project management services. ● Why project management? ● The role of valuer and real estate surveyor.
3. Development finance, appraisal and risks	● Market data collection, analysis and projections, project finance, source of finance, methods of development finance, financial evaluation and report writing including project loan ● Pro-forma calculations; leverage ratios, loan-value ratios and other relevant financial analysis and projections.
4. Construction and Project Management	● The choice of building contractor, design, costing, management contracting and project management. This also includes a project schedule or duration and holding period.
5. Market Research	● The suppliers and users. ● The use of property market research, types of research and the impact of research. ● Demand and supply in the market. Market condition, Forecasting, Portfolio analysis.
6. Promotion and Selling	● The methods of promotion, types of marketing and the role of agent and sales/ lettings, Advertisement, Rent, Lease term, the tenant, public relations, particulars and brochures.

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Subject Learning Outcomes (SLOs)

On completion of this subject students will be able to:

1. Undertake viability/ feasibility analysis for a real estate project and analyse the project as an economic venture in a competitive business environment.
2. Demonstrate an understanding of the novel real estate development process, using the 56-cell matrix/ model from land banking to site development.
3. Perform project funding (loan and equity), leverage ratio, loan value ratio calculations and financial analysis and reporting.
4. Demonstrate an understanding of project management services, including time keeping, project budget, quality and cost controls in managing projects.
5. Investigate and identify the different users and suppliers in the real estate market through effective market research and forecasting based on the market conditions.
6. Demonstrate and understand the different methods of promotions and advertisements to dispose of the real estate on the market.

Assessment Tasks Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Quiz	**(10%)**
Test	**(20%)**
Assignment	**(20%)**
Final Examination	**(50%)**

Assessment 1- **Assignment: Written Assignment:** There will be two written assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 2: **Quiz:** There will be two quiz weighing 5% each. Quiz is a consolidating mind sport emphasizing on lesson learnt and their possible applications. Students can expect fill in the blanks, match the columns, true-false, cross-word, levelling diagrams, etc. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 3: **Tests:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4: **Final written examination:** A 3 hour written examination weighs 50%. Final exam will be summative in nature, emphasizing on all topics covered during the semester. In general, some optional questions will be provided accommodating learning gaps. Students can expect questions, diagrams, numeric problems. Elaborating answers with appropriate examples, diagrams are highly encouraged. Final exam is a tool to evaluate students effectively as well as to understand their strengths and weaknesses, which in turn will assist in future courses review.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://www.unitech.ac.pg

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
- Cadman & Austin Crow (1990)" Property Development", London.

References
- Nigel D, & Brenden W. (2009), "Partnership in urban property development" Wiley, Canada
- Stephen P. Peca, (2009)" Real Estate Development and investment", Wiley, Canada

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS 321: Property Taxation

Courses(s)	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Property Taxation
Subject Code	PS 321
Duration	13 teaching weeks
Contact hours	6 Hours per week
Credit Points	18 (3 Lectures +3 Tutorials +0 Practical)
Delivery Mode	On campus
Prerequisites	PS112
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis
This subject covers cannons of taxation, theories of taxation, taxation concepts and principles. It closely looks at the State's power of taxation through the overall tax system in Papua New Guinea, the Department of Lands & Physical Planning and the various municipalities who charges land rent and land rates, the established legislations through which the land rent and rates are charged in PNG, and the valuation of land rents and land rates**.**

Subject Topics
1. Introduction to taxation theories concepts and principles and cannons of taxation
2. Property tax systems
3. Property tax bases
4. Legislation for property tax purposes and legal cases
5. Administration of property tax systems and property tax bases
6. Current trends of property tax

1. Introduction to taxation theories concepts and principles and cannons of taxation	● The various cannons of taxation, theories of taxation, taxation concepts, taxation principles globally and in PNG perspective
2. Property tax systems	● Property tax systems and constraints on property tax systems in PNG and globally. ● Why property tax is important. ● PNG's tax property systems and current issues and trends in property tax
3. Property tax bases	● Unimproved value, capital value, annual value, land value globally and PNG perspective, advantage and disadvantages of current property tax bases in PNG
4. Legislation for property tax purposes and legal cases	● Review of current legislations on property tax and the need for better property tax system in PNG, flaws of current property tax legislations in PNG, policy issues on tax administration, Legal cases underlying the application of property based tax, types of property based taxes, legal precedents on principles, etc.
5. Administration of property tax systems and property tax bases	● Review of property based tax administration systems in developed and developing economies. ● The importance of tax administrations, flaws of tax administration and benefits of good tax system
6. Current trends of property tax	● Analysis of the past and current trends on tax policies, administrative issue and implementation issues or all property ratings in PNG and way forward

Subject Learning Outcomes (SLOs)

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On completion of this subject students will be able to:

1. Demonstrate an understanding of the property tax theories, concepts and principles and their relevance to the context of property tax globally and PNG perspective
2. Appreciate and understand the different types of property tax systems use in PNG and globally
3. Develop the ability to identify and compare the different property tax bases and the economic importance, incentive functions and process within existing institutional establishments that influence and guide property tax administration
4. Critically analyse and demonstrate the understanding of the link between property tax policy objectives, strategies, instruments and other economic policies and instruments with respect to the current legislation on property tax and the legal cases that set precedent for tax bases in PNG and globally
5. Competent in understanding and management of the different tax systems and property tax bases and critically identify and analyse issues and constraints of tax systems and tax bases
6. Apply the skills in analysing the current and past property tax policies and tax systems and way forward for property tax in PNG and globally

Assessment Tasks Weighting
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Test	**(25%)**
Quiz	**(5%)**
Assignment	**(20%)**
Final Examination	**(50%)**

Assessment 1- **Tests:** There will be two tests each weighing 10% and 15% respectively. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; recreate important diagrams and flowcharts; solve numeric problems. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 2- **Quiz:** There will be one quiz weighing 5%. The quiz will test the students to think fast and answer the questions with limited time given. The quiz will cover the general overviews of the subject. The quiz will consist of short answers, matching, multiple choices and filling in the blanks. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 3- **Written Assignment:** There will be two written assignment weighing 10% each. Student will work can work as a group in discussing the assignment but each student will come up with his or her own write up for both assessment task. A maximum of two weeks is needed for each assessment task to complete the tasks.

Assessment 4- **Final written examination:** A 3 hour written examination weighs 50%.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/main
http://asix.unitech.ac.pg/apps/pnguot/sites/default/files/images/AcademicIntegrityPolicy.pdf

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
- Bahl, R. (2009). Property Tax Reform in Developing and Transition Countries. USAID http://pdf.usaid.gov/pdf_docs/PNADW480.pdf

References

1. Bird, R. M. and Slack, E. (2002). Land and Property Taxation: A Review. World Bank.
2. Eckert, J.K., (1990), Property appraisal and assessment administration, International Association of Assessing Officers, Chicago, Illinois.
3. Land Act. 1996 No.45
4. Organic Law on Provincial and Local Level Government
5. Valuation Act CAP. 327

Relevant Unitech Policies

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It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS322: PROPERTY RESEARCH PROPOSAL

Course Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name Property Research Proposal
Subject Code PS322
Duration 13 teaching weeks
Contact Hours 6 hrs / week
Credit Points 16 (3 lectures + 3 hrs consultation)
Delivery Mode On campus
Prerequisites Nil
Co-requisites Nil
Subject coordinator TBA

Synopsis
This subject introduces students to skills, knowledge and practices used by researchers in the research process. Particular emphasis is placed on the preparation and presentation of a research proposal that is ready for implementation in the final (4th) year of study when students undertake PS404 Property Research Dissertation.

Moreover, students are guided in selecting a research topic that interests them, however, with an orientation to the landed profession and discipline. The research topic is then developed into a specific area of research. In doing so, the focus is on specific aspects of doing research. These include research definition, literature search and its critical assessment, framing of the research question and designing the research. In addition, data collection and analysis methods and ethical issues that pertain to the proposed study are addressed.
Ultimately, students develop competence in assessing the validity of the published literature, determining the gaps in the evidence and developing a feasible study design that complies with the principles underpinning responsible research practice.

Subject Topics
1. The research process, research proposal, research paradigm and methodology
2. Developing a working research topic and research definition
3. Literature review
4. Research design
5. Data collection and analysis methods
6. Research Ethics and planning

Topics	Contents
1. The research process, research proposal, research paradigm and methodology	● Research process and research proposal layout. ● Introduction to research paradigm and methodology
2. Research topic and research definition	● Developing research topic; ● Research definition - Research problem statement and research questions, or Central research question and investigative questions, Hypothesis or Model to be tested
3. Literature Review	● Fundamentals to conducting a literature review and critically analysing literature

4. Research design	● Develop research design: - ● General research designs include exploratory research, descriptive research, causal research; qualitative research and quantitative research among others; ● Other research designs include experimental, survey, comparative, case study, observational, action research, mixed research
5. Data collection and analysis methods	● Data collection techniques & procedures – Survey, Interview, Observation, Experiment, Focus group ● Population sampling frame, representative sample size, methods of sampling ● Data analysis: -Quantitative data: statistical software and analytical procedures for quantitative data ● Qualitative data: type of coding and interpretation
6. Research ethics and planning	● Ethics in research, professional standards. ● Planning of the research activities (milestones) – Budget and Gantt Chart

Subject Learning Outcomes
On completion of this subject, students will be able to:

1. Undertake a topic analysis and decide on the best research method and its limitations to study the problem;

2. Identify through literature review and anecdotal evidence a likely valuation, land administration, land development, property management and real estate problem;
3. Explain and evaluate alternative research techniques and designs;
4. Assess published research by reference to methodologies and designs;
5. Identify and use appropriate data analysis techniques;
6. Prepare a research proposal for a selected research topic which should be based on a problem.

Assessment Tasks and Weightings
To obtain a pass grade in this subject, at least 50% overall must be achieved. There is no written examination held for this subject as it is assessed 100% by continuous assessment.

Students must also refer to the Subject Assessment Details.

Written Assignment **(70 %)**
Oral Presentation **(20%)**
Consultation **(10%)**

The weight accorded to each assessment component comprises consultation 10%, oral presentation of preliminary research proposal 10%, written preliminary research proposal report 10%, oral presentation of final research proposal 10% and written final research proposal report 60%.

Assessment 1- **Written Assignment:** The assignment allows students to research and to communicate the research appropriately and effectively in written format. Contributes 70% towards the final grade for the subject

Assessment 2- **Oral Presentation:** This assessment will contribute 20% towards the final grade for the subject. Students are required to present their preliminary report viva voce within an allotted period to a panel of academics in the land studies discipline in the Department concerned.

Assessment 3- **Consultation:** Underlying the process of developing the research proposal is an expected active learning interaction between student and supervisor. Contributes 10% towards the final grade for the subject.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism http://asix.unitech.ac.pg/apps/pnguot/main
http://asix.unitech.ac.pg/apps/pnguot/sites/default/files/images/AcademicIntegrityPolicy.pdf

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
- Punch, K.F. (2000). Developing Effective Research Proposals, Sage, London, UK

Readings and Resources

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1. Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. (4thed.). Thousand Oaks, CA: Sage.
2. Oliver, P. (2004). Writing your thesis. New Delhi:Vistaar Publications.
3. Walliman, N. (2011). Research Methods: The Basics. Abingdon: Routledge.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS323: SOCIAL MAPPING STUDIES AND FIELD CAMP

Course Bachelor of Property Studies (NQF Level 7)
Subject Name Social Mapping Studies and Field Camp
Subject Code PS323
Duration 13 teaching weeks
Contact Hours 6 hours per week
Credit Points 16 (3 Lectures + 0 Tutorial + 3 Practicals)
Delivery Mode Both on & off campus and
Prerequisites PS111, PS112, PS121, PS 122, PS211, PS212, PS313
Co-requisites Nil
Subject Coordinator TBA

Synopsis
This subject basically deliberates on the legal processes and requirements to effectively carry out social mapping studies in resource development sites or on any other lands with economic development potential, by using various field oriented processes and techniques to correctly identifying landowner, land and resources, and taking special consideration to other social changes and policies in land investigation, acquisition, dispute settlement, and other dealings with the responsible institutions. The subject also engages students to have real time hands – on experience in the areas of Land Administration, Valuation and Property Management, inculcating their abilities and competencies level in problem solving, disseminating information and exchange of knowledge and ideas with resource owners.

Subject Topics

1. Introduction to Social Mapping
2. Social Mapping Processes & Requirements
3. Landowners Identification Using Social Mapping
4. Contemporary Land Issues of Social Mapping
5. Practical Application of the Various Method of Real Estate Valuations
6. Practical Application of Land Administration Processes
7. Practical Application of Property Management;

Topics	Contents
1. Introduction to Social Mapping	● Land Tenure Review SM Context; ● Perception of land, Land & Ownership Characteristics, Interest in Land, Ownership Rights, Man-Land Relationship, Global Drivers, Land & Property Importance
2. Social Mapping Processes & Requirements	● Social Mapping Defined; ● Definition, SM & PNG Constitution, Mode of Application, Complementary Tools, SM Requirements & Procedures/Approaches,

	SM Benefits, Effectiveness & Efficiency, Short Comings of SM and Way Forward.
3. Landowners Identification Using Social Mapping	● Statutory Requirements & Formalities for LOI study; LIR Requirements, LIR Content, LOI Study using Genealogy; ● Genealogy History Investigations, Use of Reliable Sources, Primary & Secondary Sources, Use of Family History Pedigree Genealogical Chart & Clan Census Register and Genealogy in PNG.
4. Contemporary Land Issues of Social Mapping	● Social & Political Issues Related to SM; Language Barrier, Place to Work, No Detailed Maps, Stakeholders Comprehensive Participation, Funding, Cost, Boundary & Ownership Disputes, Time, Natural Limitations, and Safety, Health and Hygiene. Strategies to Deal with SM Issues.
5. Practical Application of Valuation	● Valuations of Residential, Commercial & Industrial Properties; ● Land & Improvement assessment; ● Land Compensation Assessment.
6. Practice of Land Administration Processes	● Applying the various methods of Land Dealings; Acquisition Types, Conveyancing; ● Social Mapping; ● Registration Processes.
7. Practical Application of Property Management	● Development and Planning Regulation & Analysis, Property Types, and Rentals and Marketing Analysis.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate understanding of the legal requirements to undertake landowner identification and social mapping studies in any land with economic potential and in resource development projects;
2. Employ understanding of the elements, process and procedure of social mapping studies using appropriate techniques;
3. Demonstrate understanding of the process and procedure in undertaking landowner identification studies;
4. Exhibit correct, ethical and unbiased procedures in social mapping and landowner's identification studies;
5. Demonstrate effective application of valuation, land administration and property management to actual field experience.
6. Demonstrate ability and competencies to work as a team in carrying out investigations, data collections, and produce well-articulated and professional field investigation reports and presentations.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject and the field work assessment. The final written examination weighs 30% with field work 20% and continuous assessment weighs 50%.

Quiz	**(10%)**
Test	**(20%)**
Written Assignment	**(20%)**
Field Work Assignment	**(20%)**
Final Examination	**(30%)**

Assessment 1- **Written Assignment:** There will be two written assignments each weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 2- **Quiz:** There will be two quizzes each weighing 5%. The Quizzes are to finding the students learning abilities on the lessons learnt. The Quiz takes the form of filling the blanks; match the columns, true-false, cross-word, etc. Feedback will assist teacher re-emphasize topics based on learners need**.**

Assessment 3- **Test:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect short, medium and essay type questions; develop plans, diagrams and flowcharts. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 4- **Field Work Assessment:** The assessment for the field work weighs 20% in the form of a written field report at the end of the exercise. The assessment is to evaluate the students' understanding and skills demonstrated during the practicum session.

Assessment 5- **Final written examination:** A 3 hour written examination weighs 30%. Final exam will be summative in nature, emphasizing on all topics covered during the semester. Students can expect questions and diagrams. Elaborating answers with appropriate examples, diagrams are highly encouraged. Final exam is a tool to evaluate students effectively as well as to understand their strengths and weaknesses, which in turn will assist in future courses review.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Arutangai, et.al "Land Tenure in the Pacific', University of South Pacific, Suva, Fiji, 1987.

References

1. Miller, A.D, "Introduction to the Law of Land Use in PNG", Department of Lands & PhysicalPlanning, PO Box, 5665, Boroko, 1990
2. Ron C. and Malama M. "Land Issues in the Pacific", Institute of Pacific Studies, 1994.

Relevant Unitech Policies
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PS324: REAL ESTATE VALUATION 4

Course	Bachelor of Property Studies (NQF Level 7)
Subject Name	Real Estate Valuation 4
Subject Code	PS324
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	17 (3 Lectures + 1 Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites	PS313
Co-requisites	Nil
Subject coordinator	TBA

Synopsis
This subject introduces students to statutory valuation which is an essential category of valuation practice that exclusively serves the requirements and functions of State or government. In this regard, statutory valuation is categorically dictated by the legislation of the domain and the inherent valuation principles and methods are fundamentally established and shaped by judicial precedents.
Among the various State functions and requirements, valuation of real property for tax and rating purposes is prominent. In this connection, statutory valuation supports fiscal obligations, functions and policy of government in raising revenue and also in influencing economic policies and decisions. Equally important is that valuation is instructive to critical decisions with respect to compulsory acquisition of private property and its compensation requirements. In all these undertakings, the role of the valuer as an expert witness is also explored.

Subject Topics
1. Introduction to statutory valuation
2. Principles of property taxation and legislation enabling taxation of property
3. Valuation for tax and rating purposes
4. Legislation enabling compulsory acquisition of private property and compensation
5. Valuation methods for assessing compensation in compulsory acquisition of private property
6. The role of the valuer as an expert witness in legal cases with respect to statutory valuation.

Topics	Contents
1. Introduction to statutory valuation	• Powers of State and its influences with respect to private property rights and interests • Statutory valuation and concepts

2. Principles of property taxation and legislation enabling taxation of property	● Rationale and principles of property taxation ● Legislation enabling taxation of property
3. Valuation for tax and rating purposes	● Judicial precedents that establish the principles with respect to valuation of property for tax and rating purposes ● Methods of assessment of property taxes
4. Legislation enabling compulsory acquisition of private property and compensation	● Legislation enabling compulsory acquisition of private property and compensation valuation
5. Valuation methods for assessing compensation in compulsory acquisition of private property	● Judicial precedents that establish the principles and methods of compensation assessment ● Methods of compensation assessment
6. The role of the valuer as an expert witness in legal cases with respect to statutory valuation.	● Introduction to the law of evidence; ● The valuer as an expert witness; ● Professional liability and negligence

Subject Learning Outcomes
On completion of this subject, students will be able to:

1. Demonstrate an understanding of statutory valuation and concepts.
2. Demonstrate an understanding of the principles and practice of the valuation of property for tax purposes including relevant aspects of enabling legislation, legal process and constraints on the system
3. Produce valuations for property tax purposes at an appropriate level of competence;
4. Demonstrate an understanding of the principles and practice of the valuation of property for compulsory acquisition purposes including relevant aspects of enabling legislation and legal process and system
5. Produce valuations for purposes of compensation in compulsory acquisition of private property at an appropriate level of competence;
6. Communicate professionally with clients and as an expert witness with respect to statutory valuations;

Assessment Tasks and Weightings

To obtain a pass grade in this subject, at least 50% overall must be achieved. The weight accorded to each assessment component comprises 50% for the final written examination and 50% for the continuous assessment.

Quiz **(5%)**
Test **(20%)**
Written Assignment **(10%)**
Practical Assignment **(15%)**
Final Examination **(50%)**

Assessment 1- **Written Assignment**: There will be one written assignment weighing 10%. Student will take away assignment tasks to their lodging facility where it can be prepared by referring to internet and other study materials with proper referencing. Feedback will assist teacher re-emphasize topics based on learners need.

Assessment 2- **Practical Assignment:** There will be one practical assignment weighing 15%. Students will be required to assess compensation for a simulated case of compulsory acquisition of a real property in Lae city. The practical assignment will require investigation, collection of facts and valuation evidence to complete a compensation assessment accordingly.

Assessment 4- **Tests:** There will be two tests each weighing 10%. Tests will provide a simulated environment of the final exam. In these formative assessments, student can expect to perform statutory valuation calculation, analysis and interpretation; short, medium valuation reports, and essay type questions; develop diagrams and flowcharts. Feedback will assist teacher to measure learning progress, achievement, and to evaluate the effectiveness of this subject.

Assessment 5- **Final written examination**: A 3 hour written examination weighs 50%. Final exam will be summative in nature, emphasizing all topics covered during the semester. Students can expect questions and diagrams. Elaborating answers with appropriate examples, diagrams are highly encouraged. Final exam is a tool to evaluate students effectively as well as to understand their strengths and weaknesses, which in turn will assist in future courses review.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism www.unitech

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Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 15-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Valuation Act, 1967 (PNG),

Readings and Resources

1. Bird, R. M. 2004. International handbook of land and property taxation, Cheltenham, U.K. and Northampton, Mass.: Elgar.
2. Bond, P. H and Brown P. K. 2011. Rating Valuation Principles and Practice 3rd Edition, Oxford: Elsevier Limited.
3. Brown, D. 1991. Land Acquisition, 3rd Edition, Butterworths: Sydney.
4. Hyam, A.. 1995. The Law Affecting Valuation of Land in Australia 2nd ed. (Sydney: The Law Book Co Ltd)
5. Eckert J. K (ed.) 1990, Property appraisal and assessment administration, International Chicago, Illinois.
6. Rost, R. and Collins H. 1984. Land Valuation and Compensation in Australia 3rd ed (Sydney: Australian Institute of Valuers)

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS411: PROFESSIONAL WORK EXPERIENCE

Course	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Professional Work Experience
Subject Code	PS411
Duration	One semester in workplace
Contact Hours	Not applicable
Credit Points	
Delivery Mode	Workplace
Prerequisites	All subjects of Year 1, 2 & 3
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis
This subject covers all components of Valuation, Land Administration and Property Management taught from year 1 to 3 in theory to the students. Students will demonstrate the practical aspects of the three components of Property Studies in the work place.

Subject Topics
1. Land Administration
2. Valuation (Rural and Urban valuation)
3. Property & Facility Management
4. Office General Duties

Topics	Contents
1. Land Administration	• Land Registration, Conveyancing, Transfer, ILGs and all land dealings of both customary land and alienated land
2. Valuation (Urban and Rural Valuation)	• Statutory Valuation, financial Analysis, Feasibility studies, Customary land Valuation, Compensation Land Development, rural land valuations and general valuation of land

3. Property Management	• Asset management, Facility management, commercial property management, Corporate property management and other aspects of property management
4. Office General Duties	• Attending to clients, telephone calls, filling and other office general duties

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1 Demonstrate ability to identify and evaluate major global trends in changes of land and water scarcity, rules and regulations in access to and use of land as well as conflicts on land;
2 Demonstrate ability to recognize changes and issues in land tenure, land registration systems & land management practices at the regional and global scale and explain these issues in relation to current systems and practices in PNG;
3 Demonstrate a capacity to critically evaluate and propose and develop innovative approaches within the issues of concern to improve the systems or practices.
4 Demonstrate appreciation of the work and contribution of government, non-government organizations and other institutions in addressing the issues on land, land tenure, resource tenure and development and effectively make your contribution.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. The subject is 100% continuous assessment. There is no final examination in this subject**.**

Log book records/Daily diary entries	**(10%)**
Monthly Student's Report	**(20%)**
Monthly Supervisor's Report	**(10%)**
Professional Work Experience Final Report	**(60%)**

Assessment 1- **Log book records/ Daily diary entries:** This component weighs 10%. Complete record of daily tasks performed and completed throughout the industrial training period by the student.

Assessment 2- **Monthly Student's Report:** This component weighs 20%. Monthly submission of summarised weekly and monthly report of the Industrial Training by the student. There is no strict format to follow so the student can design his/her own. Monthly reports must be endorsed by the Training supervisor.

Assessment 3- **Monthly Supervisors Report:** This component weighs 10%. Submission of the Training Supervisors report with his/her endorsement.

Assessment 4- **Professional Work Experience Final Report:** This component weighs 60% (40% Written and 20% Oral Presentation). Submission of the Professional Work Experience final report and Oral Presentation at the end of the industrial training period with the endorsement of the immediate supervisor. Log book records and daily diary entries must be endorsed by the immediate supervisor and attached as part of the appendices of the report.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Subject Text
Land Act 1996, PNG

References
1. Incorporated Land Groups Act 1974, Independent State of Papua New Guinea, Port Moresby, Papua New Guinea
2. Independent State of Papua New Guinea Constitution, 1975, Port Moresby, Papua New Guinea
3. Land Act 1996, Independent State of Papua New Guinea, Port Moresby, Papua New Guinea
4. Land Registration Act, 1981, Independent State of Papua New Guinea, Port Moresby, Papua New Guinea
5. Physical Planning Act 1989, Port Moresby, Papua New Guinea

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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PS421: LAND POLICY THEORY AND REFORMS

Course	Bachelor of Property Studies (BPST) (NQF Level 7)
Subject Name	Land Policy Theory and Reforms
Subject Code	PS421
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 lectures + 3 Tutorial + 0 Practicals)
Delivery Mode	On campus
Prerequisites	PS 112
Co-requisites	Nil
Subject Coordinator	TBA

Synopsis

This subject deals with an overview of land policies and land reforms globally and policies and land reforms adopted and formulated locally for sustainable economic and social development while protecting the environmental and embracing good governance at all levels of government. The subject covers Private and Public Policies (General), Policy Strategies, Policy Cycles, Difference between Policy and Law, Different Types of Policies, Land Policies, Different types of land reforms in the world, PNG's own land reform and current issues on land policies and land reforms in PNG.

Subject Topics

1. Introduction – The different types of policies globally practiced in public and private organizations (overall conceptual approach to policies)
2. Policy Strategies and Policy Cycles
3. Links and differences between law and policy
4. The different types of land policies globally
5. PNG's existing land policies and development aspirations
6. Land reforms globally
7. PNG's land reforms and Current land reform issues globally and in PNG

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Topics	Contents
1. Introduction – The different types of policies globally	● The different types of policies globally practiced in public and private organisations (overall conceptual approach to policies). ● Policy formulations and elements of a good policy
2. Policy Strategies and cycles	● Identification of the different types of policy strategies and importance of policies, analysis of the policy cycle to reflect desired outcomes.
3. links and differences between law and policy and other policy areas	● Establishing the differences between law and policy. Identification of distinct relationships. ● Why laws are important to policies. Current legal framework for land policies in PNG
4. The different types of land policies globally	● Specific land policies in global perspective and those of PNG and tying these polices to sustainable land development for poverty reduction, social justice, environmental protection and equal participation by women
5. PNG's existing land policies and development aspirations	● Analysis of PNG past and current land policies and identification of better/best alternative measures to correct these flaws for better and equitable land development and economic benefits to all stakeholders
6. Land reforms globally	● Careful analysis and study of global land reforms on their failures and successes. Effects of land reforms, economic and social benefits of land reforms , Risks involved in land reforms on land tenure, agrarian and other types of land reforms
7. PNG's land reforms and Current land reform issues globally and in PNG and Pacific Region	● Analysis of the past and current land reforms which PNG adopted globally, success and failure, reasons for failures and the current trends on the existing land reforms in PNG

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Demonstrate an understanding of the land policy theories and their relevance to the context of land policy development and the overall policies with respect to sustainable development.

2. Demonstrate ability to apply the principles and strategies of good land policy to develop a comprehensive land policy.

3. Demonstrate ability to identify and assess the economic importance, incentive functions and process within existing institutional establishments that influence and guide land tenure development and policy initiatives.

4. Demonstrate understanding of the link between land policy objectives, strategies, instruments and other economic policies and instruments with respect to national development strategies.

5. Demonstrate an understanding of the nature and scope of land policy and land reform in relation to land administration in general.

6. Demonstrate understanding of the operational and management issues of land administration.

7. Demonstrate awareness of the institutional issues and other factors changing the management of land and property information.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Quiz **(5%)**
Test **(20%)**
Assignment **(25%)**
Final Examination **(50%)**

Assessment 1- **Assignment:** There will be two assignments each weighing 10 and 15% respectively. The assignments will be individual task based on the topics covered with more emphasis on the technicalities of the land dealings in relation to land use. Students can use the internet, modules and text books to do the assigned task.

Assessment 2- **Quiz:** There will be one quiz weighing 5%. The quiz will be a closed-book quiz covering the entire syllabus. This will include multiple choice, short answers, filling in the blanks, matching

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	and true or false. The quiz is meant to give a general picture to the lecturer on the understanding on the students on the entire syllabus covered in the semester
Assessment-	**Tests:** There will be 2 tests each weighing 10%. These tests will be a closed-book test to assess the general understanding of the students regarding the subject covered. The students are expected to answer essay type questions and short answers.
Assessment 5-	**Examination:** The final examination has 50%. The exam is a closed-book where students are expected to answer essay type questions and short questions.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
Wallace J, (2009) Centre for Spatial Data Infrastructures and Land Administration. The University of Melbourne, Australia

References

1. Knetsch, J. & Trebilock, M. (1981), Land Policy and Economic Development in Papua New Guinea, A Institute of National Affairs Publication, Port Moresby.
2. Platt, Rutherford H., (1996) Land Use and Society: Geography, Law, and Public Policy. Island Press
3. Crocombe, R., (1975), Land tenure in the Pacific, London, Oxford (Reprinted in 1977 by University of South Pacific.
4. Supplementary reference Material if any

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

PS422: PROPERTY RESEARCH DISSERTATION

Course	Bachelor of Property Studies (NQF Level 7)
Subject Name	Property Research Dissertation
Subject Code	PS422
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	18 (3 lectures + 3 Tutorial + 0 Practical)
Delivery Mode	On campus
Prerequisites	Nil
Co-requisites	Nil
Subject Coordinator	**TBA**

Synopsis
To expose students to the preparation, planning and execution of research and writing up of research findings, editing and making recommendations. The students will individually undertake a research study on a selected topic related to land administration, property management and valuation from either a legal, economic and social point of view or a combination of all the three through a guided study.

This is an individual research project on a selected topic under the supervision of a research supervisor. It builds on the subject with previous code PS306 to enable students to produce a research report. Generally, guidance and direction will be provided on data collection, data analysis and results generation and tabulations and synthesis of the material for the research report production, report submission and presentation. Teaching will be done through blended learning (i.e., a mixture of online and face-to-face teaching and learning.

Subject Topics
1. Planning, undertaking and managing a research project; learning the principles of academic writing devoid of plagiarism and using recent citations to avoid assertions that have no place in academic writing
2. Setting appropriate research objectives, research questions and hypotheses

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3. Conceptualisation and Literature Review
4. Designing appropriate research methods, sample selection, collection of survey data and undertaking data analysis
5. Generating research results and preparing results for presentation
6. Relating research results and findings to previous studies (literature) and drawing conclusions
7. Using Turnitin software to check research report for plagiarism, preparing the research report based on research findings and communicating the findings through oral presentations to a professional audience and submitting the research report for grading.

Topics	**Contents**
1. Planning, undertaking and managing a research project; learning the principles of academic writing devoid of plagiarism and using recent citations to avoid assertions that have no place in academic writing.	● Selecting a good, topical, sellable and cutting-edge topic within the domain of Property Studies and Urban Planning (because urban planning creates property values); ● A topic that looks good or interesting may not necessarily be researchable if there will be no data to support it; research process from start to finish; avoidance of assertions, using strong citations, and using appropriate grammar.
2. Setting appropriate research objectives, research questions and hypotheses.	● Guiding students on how to set good research objectives, research questions and hypotheses. This is better done on a one-on-one basis in the class using one or two topics as examples. This is one of the most difficult of a research dissertation because it is the foundation of the entire research that can make or mar the success of the research.
3. Scientific conceptualisation of research problems to introduce analytic rigour. The conceptual framework is the researcher's own vision of the research process and outcome.	● Using the main concepts or terms embedded in the research topic or title to design a framework that will be used as the researcher's vision for the entire research process. ● Use of conceptual diagrams or relevant theories will be helpful here. It is a complex section of the research project and should be carefully managed, otherwise many students will be confused. ● A good conceptual or theoretical framework will normally be used by the student to guide literature review.
4. Designing appropriate research methods, sample selection, respondents' consent; collection of primary and secondary data.	● Design of appropriate research methods and questionnaires, obtaining respondents' consent to participate in questionnaire survey without being forced to; selection of appropriate sampling techniques; questionnaire administration (with or without language interpreters, etc.
5. Undertaking data analysis, generating research results and interpreting the results for presentation.	● Using a combination of insights and lessons learned from relevant previous studies, statistical methods are used to generate research findings that must be properly interpreted in the order of the research objectives, research questions and hypotheses.
6. Relating research results and findings to previous studies (literature) and drawing conclusions.	● Comparing the findings to previous research findings to identify similarities and differences between current research and previous studies. Making recommendations and conclusions.
7. Using Turnitin software to check research report for plagiarism, preparing the research report based on research findings and communicating the findings through oral presentations to a professional audience and submitting the research report for grading.	● Using Turnitin software to check research report for plagiarism, preparing the research report based on research findings and communicating the findings through oral presentations to a professional audience and submitting the research report for grading

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Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Plan, undertake and manage a research project; apply the principles of academic writing devoid of plagiarism and use recent citations to avoid assertions that have no place in academic writing.
2. Set appropriate research objectives, research questions and hypotheses.
3. Conceptualise research problems scientifically to introduce analytic rigour.
4. Design appropriate research methods, select sample, collect data and undertake data analysis
5. Generate research results and compare results with previous studies for presentation
6. Relate research results and findings to previous studies (literature) and draw conclusions
7. Using Turnitin software, check research report for plagiarism,
8. Prepare the research report based on research findings and communicate the findings through oral presentations to a professional audience and submit the research report for grading

Assessment Tasks and Weightings

To obtain a pass grade in this Subject at least 50% overall must be achieved, and at least 40% achieved in the Research Literature Review and Methodology Final Report.

Students must also refer to the Subject Assessment Details.

Research Proposal	**(10%)**
Research Literature Review and Methodology Report	**(25%)**
Research Literature Review, Methodology and Case Study Final Report	**(45%)**
Audio-Visual Presentation of the Research Literature, Data Analysis and Findings	**(20%)**

Assessment 1 - **Research Proposal**: It is worth 10% of the total mark for the Subject.

Assessment 2 - **Literature Review and Methodology Report:** helps to facilitate the structuring of the research literature review by requiring a Research Literature Review and Methodology Report, which must include a critical review of the international literature. The progress report will be presented as a concise property studies report. It is worth 25% of the total mark for the Subject.

Assessment 3 - **Literature Review, Methodology and Case Study Final Report:** requires the production of the Research Literature Review, Methodology and Case Study Final Report that will be a critical review of the international literature and include ethical and sustainability aspects. The final report will be presented as a concise property studies research report. It is worth 45% of the total mark for the Subject.

Assessment 4- **Audio-Visual Presentation:** provides an opportunity for the Audio-visual Presentation of the Research Literature, Data Analysis and Findings. This is a viva-voce examination delivered in seminar format to a panel of examiners (predominantly drawn internally comprising faculty in the department) and the student cohort registered for the subject. It is worth 20% of the total mark for the Subject,

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Texts
Research Methodology in Social and Environmental Sciences as Recommended by the Lecturer.

References
1. Relevant Regulations / Code of Ethics, e.g. PNGIVLA, RICS, Australia/New Zealand and RECO-Canada, IVSC Standards
2. Previous Research Publications as suggested by the Lecturer.

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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PS423: CORPORATE REAL ESTATE MANAGEMENT

Course	Bachelor of Property Studies (NQF Level 7)
Subject Name	Corporate Real Estate Management
Subject Code	PS423
Duration	13 teaching weeks
Contact Hours	6 hours per week
Credit Points	17 (3 lectures + 1 Tutorial + 2 Practicals)
Delivery Mode	On campus
Prerequisites	PS111
Co-requisites	PS 411
Subject Coordinator	TBA

Synopsis

This subject introduces students to different real property assets and facilities owned by Corporations and the appropriate management approaches. It also introduces to students the need for planning and developing sustainable strategies for effective management of corporate real estate assets.

Subject Topics

1. Corporations and Organizations and their functions
2. Corporate Real Estate
3. Corporate Planning; Strategic Planning; Alignment of Corporate Real Estate
4. Space planning and audit
5. Computers in Corporate Real Estate
6. Benchmarking and performance measurement
7. Outsourcing of corporate real estate management
8. Risks in Corporate Real Estate Management

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9. Health and safety issues in corporate real estate management
10. Master plan
11. Relationship of Corporate Real Estate to Organization
12. Human resource management and needs analysis
13. Development of asset management systems

Topics	**Contents**
1. Corporations and Organizations and their functions	● Organisations and their functions; ● Corporations and their functions; ● Difference between organisations and corporations.
2. Corporate Real Estate	● Introduction to Corporate Real Estate - economic importance of CRE; ● Corporate real estate management (CREM), assets, facilities and portfolio management; strategic contribution of CREM
3. Corporate Planning; Strategic Planning; Alignment of Corporate Real Estate	● Corporate Planning: stages of corporate planning, process of corporate planning- strategy, formulation, implementation and control, types of corporate planning. ● Strategic Planning: what is strategic planning? overview of a strategic plan(SP), how to conduct strategic planning(SP), how to apply the strategic planning model, importance of SP in a business and features of a strategic plan. ● Corporate real estate strategies and Organisation's competitive strategies
4. Space planning and audit	● Getting your commercial office space right; office space planning; open floor plan; ● design for division and density, space density and office layout-control
5. Computers in Corporate Real Estate	● Why need commercial real estate software? occupancy cost analysis, document and data management, portfolio benchmarking, collaboration and reporting, critical date management; ● Effective management of facilities and real estate using computers soft-wares.
6. Benchmarking and performance measurement	● Benchmarking of corporate and real estate performance, performance indicators; ● The intersection of productivity and sustainability-the new approach; ● Corporate Performance, basic types of sustainable competitive advantages of a firm; ● primary determinants of profitability (resources and capabilities), basis for determining added value for corporate real estate, traditional vs contemporary measures of value creation.
7. Outsourcing of corporate real estate management	● Objective of outsourcing, positive benefits and negative consequences of outsourcing of corporate real estate management; ● which corporate real estate management functions should be outsource?
8. Risks in Corporate Real Estate Management	● Importance of risks management in Corporate Real Estate; ● Strategic business risks and corporate real estate; Managing a new type of portfolio; ● Risks Management; ● New ways of evaluating the Corporate real estate portfolio; ● Understanding risks and informing decision making
9. Health and safety issues in corporate real estate management	● Current issues and trends in corporate real estate and facility management; ● The role for CRE team, key success factors for rolling out H&S change management process.

10. Master plan	● What is a Master Plan? ● Steps of developing an effective master plan
11. Relationship of Corporate Real Estate to Organization	● Business Strategy and Corporate Real Estate - incremental strategy, value-based approach, standardization strategy; ● Corporate Real Estate – a platform for integration, the three principle categories; ● CRE practices and the economic performance of a business enterprise
12. Human resource management and needs analysis	● What is Human Resource Management? recruitment, training and development, performance appraisal and rewarding , industrial relations; ● Training Needs Analysis- why needs analysis, indicating factors of employees training and development needs, purpose and objective for conducting needs assessment, types of analysis, conducting a needs analysis
13. Development of asset management systems	● What is Asset Management System?; ● Asset management systems-enterprise asset management program, AM systems currently in use.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to

1. Demonstrate an understanding of different real property assets or facilities owned by corporations and the appropriate management approaches applicable.
2. Identify, plan and develop sustainable strategies for effective management of corporate real estate assets.
3. Exhibit an understanding of the senior management executive's attitude and approach toward corporate real estate.
4. Develop a professional and sustainable relationship between corporate real estate core department and other departments/sections in the corporation/organization.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details.

Tests **(20%)**
Assignment **(30%)**
Final Examination **(50%)**

Assessment 1: **Tests:** There will be 2 tests each weighing 10%.
Assessment 2: **Assignment:** There will be two assignments each weighing 15%.
Assessment 3: **Final written examination:** A 3 hour written examination weighing 50%.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text
(Note that there is no specified subject Text as yet)

References

- AAMCoG (2012). Guide to Integrated Strategic Asset Management, Version 2.0. Retrieve 03 June, 2015 from www.kmcgovern.com/wp-content/uploads/2012/07/

Relevant Unitech Policies
It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

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PS424: REAL ESTATE VALUATION 5

Course Bachelor of Property Studies (NQF Level 7)
Subject Name Real Estate Valuation 5
Subject Code PS424
Duration 13 teaching weeks
Contact Hours 6 hours per week
Credit Points 17(3 lectures + 1 Tutorial + 2 Practicals)
Delivery Mode On campus
Prerequisites PS121, PS211, PS313, PS322 and PS324
Co-requisites PS422
Subject Coordinator TBA

Synopsis
The subject gives students the opportunity to have an in-depth study in relation to a diverse range of specialised property and the underpinning characteristics and factors which lead to the creation of value in the types. The subject also considers special purpose valuations relating to insurance, hypothetical subdivision, financial reporting and terminating interests.

Subject Topics
1. Types and characteristics of specialised properties
2. Specialised property market in perspective
3. Valuation process for specialised properties
4. Special purpose valuations

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Topics	Contents
1. Types and characteristics of specialised properties	● What is a specialised property? ● Types of specialised properties, characteristics of specialised properties, valuation of specialised properties
2. Specialised property market in perspective	● Physical, environmental, economic and social context of a range of specialist property markets, factors that affect the value of specialised properties
3. Valuation process for specialised properties	● Basis and methodology for the valuation of specialised properties, purpose of valuation, professional valuation reports
4. Special purpose valuations	● Insurance valuation, valuation for financial reporting purposes, hypothetical subdivision valuation, valuation of terminating interests.

Subject Learning Outcomes (SLOs)
On completion of this subject students will be able to:

1. Explain the key concepts and principles that guide the valuation of specialised properties.
2. Demonstrate an understanding of the appropriate approach in undertaking special purpose valuations including insurance valuation and valuation of terminating interest.
3. Value specialised properties using appropriate methods of valuation at an acceptable level of competency.
4. Explain the factors that affect the value of specialised properties.
5. Produce high quality valuation reports with clear demonstration of acceptable level of competency and professionalism.
6. Communicate effectively with clients, professionals and other stakeholders when undertaking a specialised valuation.

Assessment Tasks and Weightings
To obtain a pass grade in this subject at least 50% overall must be achieved. There is a final examination in this subject. The final written examination weighs 50% and continuous assessment weighs 50%.

Students must also refer to the Subject Assessment Details

Test **(20%)**
Assignment **(30%)**
Final Examination **(50%)**

Assessment 1: **Written Assignment:** There will be two assignments each weighing 15%.

Assessment 2: **Tests:** Tests are considered constructive checks to student learning of the course content and effectiveness of subject. The nature and construction of tests mimic a final examination setting. Tests, in this respect, comprise short, medium and essay type questions, recreation and explanation of important diagrams and flowcharts and solving computational (numeric) problems. Results from the tests will provide the teacher guidance to evaluate learning progress, achievement and effectiveness of this subject.

Assessment 3: **Final Examination:** A 3 hour written examination weighing 50%.

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/

Student Workload
The total workload for the subject for the 'average' student is a nominal 150 hours, based on a 14-week semester with 13 weeks of teaching as per the PNG National Qualification Framework.

Subject Text Book
- Armatys, J., Askham, P., Green, M. (2009), Principles of Valuation, Abingdon, Oxon UK, EG Books

References

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1. Australian Property Institute and Property Institute of New Zealand. (2009). Australia and New Zealand valuation and property standards 2009, Deakin: Author
2. International Valuation Standards Council. (2017). International valuation standards 2017. London: Author
3. Royal Institute of Chartered Surveyors. (2017). RICS Valuation Global Standards 2017, London: Author
4. Royal Institute of Chartered Surveyors. (2014). RICS Valuation - Professional Standards 2014, London: Author

Relevant Unitech Policies

It is important that all students familiarise themselves with the University of Technology Assessment Guidelines including those on plagiarism which can be accessed at www.unitech.ac.pg/AssessmentGuide/ and www.unitech.ac.pg/Plagiarism/