

Bachelor in Geomatics

Proposed to be offered
under DISTANCE MODE

By

Department of Surveying
& Land Studies

(Facilitator: Department of Open and
Distance Learning- DoDL)

THE PAPUA NEW
GUINEA
UNIVERSITY OF
TECHNOLOGY

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Overview of Department of Surveying and Land Studies

The Department of Surveying & Land Studies is primarily involved in the process of developing human resources adept in the holistic management of land resources. Papua New Guinea is endowed with enormous land resources (vis-à-vis population); which are grossly under-utilized. Here is the relevance of the department that produces the entire gamut of geomatics and land management professionals – starting from the discipline of ‘Surveying’, Geographical Information Science / Systems to the property management /valuations experts. The Department at present offers degree programs in the above fields as well as Master’s program: M.Sc. Remote Sensing & GIS (in distance mode). Now the Department proposes to commence a B.Sc. Program in Geomatics through distance mode.

The human resources developed in the department have wide exposure to the state of the art technology of geomatics engineering (e.g. Remote Sensing, GIS, GPS surveying, Total Station surveying etc.) and land management in their respective disciplines. The application of technology is emphasized, as is the role of the professionals in the development of PNG. The Department has been producing graduates for about four and half decades and many graduates occupy senior positions in Government and the private sector in PNG and the Pacific Region.

The courses offered in the Department are specific but considerable overlapping of discipline areas is encouraged with the aim of producing broad based graduates. The Department *has already created a state-of-the-art Remote Sensing lab with adequate hardware and software support*, juxtaposed to the augmented Spatial Data Infrastructure lab. Also the department has good existing facilities including a comprehensive digital mapping, geographic information systems and remote sensing laboratory, state of the

art Global Navigation Satellite System (GNSS) receivers, using the GPS, GLONASS, Galileo or Beidou system technology and software, a spatial information science/cartographic processing laboratory and automated surveying systems in addition to the traditional surveying and mapping facilities.

Objectives of B.Sc. in Geomatics

Geomatics is the fusion of geography and informatics activities and services involved in the collection, analysis, management, and integration of location-based data to enable improved decision and policy making. The Geomatics program will include courses in geographic information systems, remote sensing, photogrammetry, global positioning and surveying, spatial statistics, and computer science. The computer science component (especially the use of application softwares) will give graduates the strongest advantage in the field of Geomatics. Students completing this program will be able to go beyond the competent use of existing Geomatics tools to develop applications involving spatial database development and management, data dissemination, spatial analysis, decision support, and modeling.

Given the severe paucity of spaces in tertiary education system in the country, only 20% of students in Grade 12 are considered for universities and colleges throughout the country (1 in 5). This course will open another opportunity to continue further studies.

Individuals with bachelor's degrees in geomatics will have diverse employment opportunities. Careers may include: Geospatial analyst, GIS technician, Geodesy research associate, Survey operations coordinator etc.

Admission requirements:

B grades in Major Mathematics, English, Physics, Geography and Information Technology. (Recommended courses: Introduction to Computer Science is recommended)

Duration of the course and award:

The program 'B. Sc in Geomatics' to be offered in DISTANCE MODE shall have a duration of a little over four years (*nine semesters*) with the session starting from November and ending in November/December. The residential (physical contact) period is proposed to be in the months of November-December while, depending upon the situation.

A student who will successfully completing entire four years will be awarded a Bachelor in Geomatics.

COURSE STRUCTURE

Year 1

	Hours(Lec., Tut., Lab)	CCC
Semester 1 (R)		
MAE 101 Introductory mathematics for Geomatics	(4-1-0)	20
PHE 103 Introductory Physics for Geomatics	(4-1-1)	21
CSE 105 Computer skills fundamentals for Geomatics	(2-0-4)	15
GEOM 107 Introduction to Surveying	(1-0-4)	10
GEOM 109 Introduction to Remote Sensing	(3-0-0)	13
Total		79

Semester 2 (D)

GEOM 102: Introduction to GIS	(3-0-0)	13
GEOM 104: Thermal, Hyper spectral and Microwave Remote Sensing	(3-0-0)	13
GEOM 106: Survey Computations	(3-0-0)	13
GEOM 108: Map reading and projection	(3-0-0)	13
GEOM 110: Introduction to Global positioning System	(3-0-0)	13
Total		65

Year 2

Semester 1 (R)

GEOM 201: Satellite Image interpretation using Erdas Imagine	(1-2-4)	15
GEOM 203: GIS practice using ArcGIS	(1-2-4)	15
GEOM 205: Introduction to Geomatics	(1-0-6)	13
GEOM 207: Practice on Global Navigation System (GPS/GNSS)	(1-0-6)	13
GEOM 209: Computer Aided Drafting - Autocad	(1-0-4)	10
Total		66

Semester 2 (D)

GEOM 202: Surveying and mapping Practice	(3-0-0)	13
GEOM 204: Digital Image processing	(3-0-0)	13
GEOM 206: Land Tenure and Administration	(3-0-0)	13
GEOM 208: Geodesy and Geodetic positioning	(3-0-0)	13
GEOM 210: Data base management	(3-0-0)	13
Total		65

Year 3

Semester 1 (R)

GEOM 301: Satellite Image enhancement, classification & mapping	(1-2-4)	15
GEOM 303: Programming for Geomatics	(1-0-4)	10
GEOM 305: Engineering Survey	(1-0-4)	10
GEOM 307: Cadastral surveying principle and practice	(1-0-4)	10
GEOM 309: Introduction to Mapinfo professional	(0-2-6)	13
Total		58

Semester 2 (D)

GEOM 302: Statistics for Geomatics	(2-1-0)	11
GEOM 304: Remote Sensing application	(3-0-0)	13
GEOM 306: Marine geomatics and resource management	(3-0-0)	13
GEOM 308: Arial photography and Photogrammetric measurements	(3-0-0)	13
GEOM 310: Introduction to urban and regional planning	(3-0-0)	13
Total		63

Year 4

Semester 1 (R)

GEOM 401: Spatial data modelling, analysis & mapping -ArcGIS	(0-2-4)	10
GEOM 403: Subdivision principle and design	(1-0-4)	10
GEOM 405: Satellite Geodesy	(2-2-0)	13
GEOM 407: Writing a Research Paper and managing research project	(2-2-0)	13
GEOM 409: RS/GIS/Geomatics project proposal	(1-0-5)	12
Total		58

Semester 2 (D)

GEOM 402: Application of Geoinformatics	(3-0-0)	13
GEOM 404: Geomatics in Hydrographic survey	(3-0-0)	13
GEOM 406: Transportation Engineering	(3-0-0)	13
GEOM 409: RS/GIS/Geomatics project progress	(0-0-10)	15
Total		54

Semester 3 (R)

GEOM 411: Spatial data handling using open source GIS S/W	(0-2-4)	10
GEOM 409: RS/GIS/Geomatics project Implementation	(0-0-15)	22
Total		32

TOTAL- 22 Residential (5R) and 19 distance (4D) courses: 540CCC

Program Outcome (PO)			
P01	Have a sound knowledge and understanding of the use and application of geospatial technologies in solving geographic problems of various domains, e.g., environmental, natural resources, land management and administration, government, health, utilities, transport, etc.		storing, managing and accessing these large volumes of data.
P02	Be competent in the foundation of surveying, essential GIS operations and demonstrate sound knowledge on the nature and properties of geospatial data	P08	Be conversant with various geomatics commercial and open source software and, utilize available computer technology in the different tasks in Geomatics.
P03	Have the foundation of remote sensing, able to perform data collection for RS and GIS analyses, including GPS, satellite imagery, and handling collateral data like topographic maps, scanned photographs, etc.,	P09	Be knowledgeable of the various methods of Geospatial Analysis, GIS and Cartographic Modelling using spatial and aspatial data in solving geographic problems.
P04	Be conversant in technology involved in geodetic, cadastral, engineering and construction, mining and hydrographic surveys toward land administration, property development and value addition. Be able to competently communicate above geospatial information collected.	PO 10	Provide a sound foundation in the principles and professional practices of surveying and mapping including a spatial measurement and assessment
P05	Know how to design, develop and manage GIS and remote sensing application projects from the numerous possible applications including, land and natural resource developments, environmental monitoring and management.	PO 11	Develop an appreciation of the factors affecting the tenure and land use decision in Papua New Guinea and the Pacific Island Nations;
P06	Have sound knowledge of the physics and mathematics associated with surveying, GIS and Remote sensing processes; able to do survey computations.	PO 12	Prepare graduates to be able to communicate, exchange and share information effectively with other professionals and community.
P07	Be able to differentiate between various forms of remote sensing data – optical IR, thermal, microwave, hyperspectral; sensors, resolution; apply appropriate data processing and design expedient strategies for	PO 13	Educate students so that after a short period of industrial training they can play an effective role in the practice and development of the geomatics profession in PNG and the Pacific Island Nations; continue further academic and professional development to suit fast changing demands of the marketplace.
		PO 14	An ability to work on multidisciplinary teams and comprehend his/her scope of work, deliverables and issues in which able to lead the team towards goal
		PO 15	Possess and understanding professional, safety and ethical responsibilities
		PO 16	Possess a comprehensive knowledge of contemporary issues, adapt to changing technical scenarios, socio-economic, political landscape, their fluctuation cycles.