

BACHELOR OF GEOMATICS (NQF - Level 7)

Programme Aims/Purpose:

The Bachelor of Geomatics programme is purposefully designed to prepare students for a career as professional surveyor, with high level knowledge and skills in the acquisition, processing, presentation, and management of geospatial data. The programme provides a systematic and coherent introduction to the main theories, broad principles, concepts, data, and problem-solving techniques in the main cognate area, i.e. Geomatics. The programme will enable students to acquire cognitive skills, practical problem-solving skills, and key transferable skills that are necessary for addressing pressing geomatics challenges. In addition, the Bachelor of Geomatics will enable students to develop a sense of social responsibility, and an understanding of the role they can play in land reform and sustainable development both in Namibia and the Southern African Region.

Graduates from this programme should have full regard for achieving excellence and maintaining the highest standards of ethical conduct in the practice of their profession. On completion of this programme, graduates of this programme will be able to contribute significantly to the attainment of national development objectives in the economy by taking up jobs as professional surveyor both in the public and private sectors of Namibia.

The programme has been endorsed by members of the Programme Advisory Committee while academic peers at higher learning institutions were also consulted for purposes of international benchmarking (attached, please find evidence of consultation, benchmarking and support).

Exit Programme Outcomes (Qualification Outcomes):

Upon completion of the Bachelor of Geomatics programme, graduates should be able to:

- Perform surveying and mapping operations, under limited supervision, using a wide variety of equipment, software and techniques, under a wide variety of conditions;
- Demonstrate analytical, critical and problem solving skills with regard to the acquisition, processing, analysis and presentation of survey data;
- Produce professional survey diagrams, plans and maps (cadastral and topographic);
- Manage the effective and efficient acquisition, processing, presentation and maintenance of spatial data;
- Perform Global Navigation Satellite System (GNSS) surveys, including the design and adjustment of GNSS networks;
- Achieve the generic graduate outcomes of problem-solving, critical thinking, responsible citizenship and good communication.

Criteria for Admission:

Candidates may be admitted to the Bachelor of Geomatics programme if they meet the general Polytechnic admission requirements, and must comply with the following additional requirements: In addition to meeting the Polytechnic of Namibia's General Admission Requirements (GI2.1 in Part 1 of the Yearbook), applicants must have a combined total of at least 30 points on the Evaluation Scale, counting up to five subjects as follows:

- Minimum A-symbol on NSSC Ordinary (or 3-symbol at NSSC Higher) for Mathematics;
- Minimum B-symbol on NSSC Ordinary (or 4-symbol at NSSC Higher) for Physical Science;
- Minimum 3-symbol for English Second Language at NSSC Higher;

- A pass or proof of competency in Computer User Skills (or equivalent) or an Exemption test to be written; and
- Must be medically and physically fit for fieldwork, which forms an integral part of the programme.

Candidates who do not have proof of competency for *Computer User Skills*, but who meet all other admission requirements, may be admitted conditionally to the Bachelor of Geomatics programme. They will be allowed to do all the first semester course of Year 1 of the Bachelor programme, on condition that they also pass the course *Computer User Skills* in the same semester. They will then have to do the institutional core course *Information Competency* in the second semester.

Candidates who passed the Introduction to Science, Technology, Engineering and Mathematics (InSTEM) courses *Computer User Skills*, *Introduction to Mathematics B*, *Introduction to Physics B*, and *English in Practice*, may be admitted into the first year of the Bachelor of Geomatics programme. Preference will be given to candidates who passed all InSTEM courses.

Holders of the National Diploma in Surveying from the Polytechnic of Namibia with a mark of at least 70% in the following courses: Mathematics & Statistics for Land Management, Basic Surveying and Adjustment of Observations, may be admitted into the Bachelor of Geomatics programme with advanced standing on a course by course credit at the discretion of the Department.

Holders of the National Diploma in Surveying from the Polytechnic of Namibia, the Diploma in Geomatics from the Polytechnic of Namibia at NQF Level 6, an equivalent qualification at NQF Level 6 from a recognised institution or a pre-NQF approved Diploma over 3 years in the field of surveying/geomatics may be admitted into the Bachelor of Geomatics programme with advanced standing will be granted credits on a course-by-course basis at the discretion of the Department.

Applicants from other institutions must submit detailed information on all courses in their previous qualifications, as well as contact details of three referees.

Applicants may be required to attend a pre-selection interview and/or test at the discretion of the Department.

Mode of Delivery:

The programme will be offered on full-time mode of study in accordance with Polytechnic rules and regulations.

Requirements for Qualification Award:

The Bachelor of Geomatics degree will be awarded to students credited with a minimum of 410 NQF credits, and who have met the detailed qualification requirements for the programme as set out below. In addition, students should meet the administrative and financial requirements as spelt out in Part 1 of the Polytechnic of Namibia Yearbook.

The major cognate/subject area of learning within the programme is ‘*Geomatics*’ that is developed in increasing complexity across relevant NQF levels and in accordance with NQF principles as represented in the Table on the next page.

Courses	NQF Level
Introduction to Geospatial Data	4
Survey Drafting	4

Basic Surveying	5
Cadastral Surveying 1	5
Computer Aided Drafting	5
Survey Project	5
Cadastral Surveying 2	6
Digital Terrain Modelling	6
Engineering Surveying	6
Mine Surveying	6
Sectional Title Surveying	6
Surveying 2	6
Surveying 3	6
Digital Photogrammetry	7
Geomatics Theory of Errors	7
Surveying 4	7
Work Integrated Learning	7

Year 1: Semester 1

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisites	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
DBF510S	Database Fundamentals	Use the language SQL to design database systems and for effective data retrieval and modification.	None	Compulsory	5	100	10
EAP511S	English for Academic Purposes	Communicate accurately, appropriately and effectively in academic speech and writing within academic contexts.	English in Practice	Compulsory	5	140	14
ICT512S	Information Competence	Search effectively for information using search engines on the Internet and Web 2.0 technologies to solve given problems and critically evaluate information obtained.	None	Compulsory	5	100	10
IGD411S	Introduction to Geospatial Data	Apply relevant geographic information contained in topographic base maps and produced by Global Positioning Systems (GPS).	None	Compulsory	4	80	8
ILP510S	Introduction to Land Use Planning and Management	Analyse mandates, processes and outputs of different planning institutions on local, regional and national level.	None	Compulsory	5	120	12
MAT111S	Mathematics 1	Demonstrate understanding and interpretation of basic algebra, trigonometry and geometry, complex numbers, calculus and matrices.	None	Compulsory	5	120	12
							Total Credits: 66

Year 1: Semester 2

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisite	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
BSV521S	Basic Surveying	Demonstrate understanding of the basic plane surveying principles, techniques, technology and calculations, and accurately perform basic survey and mapping operations using a wide variety of survey techniques and equipment.	Introduction to Mathematics A	Compulsory	5	120	12
CAS520S	Cadastral Surveying 1	Demonstrate understanding of the basic principles, reasons and procedures of cadastral surveying and perform simple subdivision and consolidation of erven, including the preparation of survey records, in terms of the Land Survey regulations.	Introduction to Mathematics A	Compulsory	5	120	12
GES512S	Geographic Information Systems 1	Analyse the fundamental concepts of Geographic Information Systems (GIS) and apply the main GIS functions to selected “real world” applications.	Introduction to Geospatial Data, Computer User Skills	Compulsory	5	120	12
IPH402S	Introduction to Physics B	Demonstrate understanding of reflection and refraction from different physical media.	None	Compulsory	4	120	12
LTS520S	Land Tenure Systems	Analyse, and apply basic land tenure concepts to different tenure systems in Namibia.	None	Compulsory	5	120	12
SDR420S	Survey Drafting	Perform manual and basic computer aided drafting of cadastral and topographic maps.	Computer User Skills and Introduction to Mathematics A	Compulsory	4	60	6
SUP520S	Survey Project	Perform, manually book and calculate a basic survey comprising of a control survey,		Compulsory	5	60	6

		topographic survey, and accurate staking out of points.	Introduction to Mathematics A				
							Total Credits:72

Year 2: Semester 3

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisite	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
CAD510S	Computer Aided Drafting	Design, draft and plot various types of plans and maps using Computer Aided Drafting.	Introduction to Geospatial Data, Computer User Skills	Compulsory	5	120	12
ENS610S	Engineering Surveying	Apply basic surveying techniques in a wide range of engineering and construction applications, ranging from precise control surveys and staking out, to setting out of roads, grade profiles and ground works, and surveying, calculation and plotting of sections, areas and volumes.	Basic Surveying	Compulsory	6	120	12
LIS611S	Land Information Systems	Create and analyse land-based data such as parcel information, zoning, land use, ownership and general property information.	Geographic Information Systems 1	Compulsory	6	120	12
PGI520S	Programming for Geoinformatics	Design, implement, and verify programmatic solutions for simple problems, using suitable tools and techniques, data acquisition and visualisation.	Computer User Skills, Introduction to Mathematics A or Mathematics and Statistics for Spatial Science	Compulsory	5	120	12

RES511S	Remote Sensing 1	Apply basic methods and techniques for the interpretation of aerial photographs and remotely sensed digital images.	Introduction to Geospatial Data, Introduction to Mathematics A or Mathematics and Statistics for Spatial Science	Compulsory	5	120	12
SUR610S	Surveying 2	Perform cadastral and topographic surveys using advanced electronic surveying techniques, including digital recording, processing and presentation of survey results.	Basic Surveying	Compulsory	6	120	12
							Total Credits:72

Year 2: Semester 4

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisite	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
DTM620S	Digital Terrain Modeling	Survey and process accurate digital terrain models (DTMs), and perform advanced analysis and visualisation of surveyed data and DTMs.	Engineering Surveying, Surveying 2	Compulsory	6	120	12
GES612S	Geographic Information Systems 2	Complete spatial planning tasks based on real-world applications by integrating practical knowledge of spatial data formats, data analysis and data dissemination tools.	Geographic Information Systems 1	Compulsory	6	120	12
GTE710S	Geomatics Theory of Errors	Process and analyse survey observations and errors, including the least squares adjustment of redundant observations and transformation of coordinates.	Mathematics 1, Surveying 2, Programming for Geoinformatics	Compulsory	7	120	12
MAT120S	Mathematics 2	Demonstrate understanding and	Mathematics 1	Compulsory	6	120	12

		interpretation of differentiation and integration techniques, error approximation in calculations, differential equations, linear programming, and the application of matrix algebra					
TBC	Sectional Surveying	Survey and draft sectional plans, which must be suitable for submission to and approval by the Surveyor General and Registrar of Deeds	Survey Drafting, Computer Aided Drafting and Surveying 2	Compulsory	6	120	12
SUR620S	Surveying 3	Perform precise surveying and analysis of observations for the setting out, modelling and monitoring of 3D structures	Engineering Surveying, Surveying 2	Compulsory	6	120	12
							Total Credits:72

Year 3: Semester 5

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisite	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
CAS610S	Cadastral Surveying 2	Survey townships and prepare General Plans and survey records for approval by the Surveyor General.	Basic Surveying, Cadastral Surveying 1	Compulsory	6	120	12
DCV512S	Digital Cartography and Visualisation	Demonstrate competence in the use and application of the main cartographic principles, mapping techniques and possibilities of geographic visualisation.	Introduction to Geospatial Data	Compulsory	5	120	12

DPG710S	Digital Photogrammetry	Solve complex spatial problems by developing, analysing and visualising digital terrain models and GIS networks.	Digital Terrain Modeling, Geomatics Theory of Errors	Compulsory	7	120	12
GES711S	Geographic Information Systems 3	Assess and apply a wide range of GIS tools for advanced spatial analysis based on statistical surfaces and terrain information.	Geographic Information Systems 2	Compulsory	7	120	12
MSV610S	Mine Surveying	Demonstrate understanding of mine surveying principles, techniques and technologies, and perform basic mine surveying and mapping operations.	Basic Surveying	Compulsory	6	120	12
SUR710S	Surveying 4	Design, plan, execute and process the surveying of highly accurate control networks, using a variety of advanced surveying techniques, including triangulation, trilateration and GNSS.	Surveying 3, Geomatics Theory of Errors	Compulsory	7	120	12
							Total Credits:72

Year 3: Semester 6

Course Code	Course Title	Comprehensive Learning Outcome	Prerequisite	Compulsory or Elective	NQF Level	Notional Hours	NQF Credits
CIS610S	Contemporary Issues	Evaluate the impact of contemporary issues on society and develop strategies to	None	Compulsory	6	120	12

		mitigate/harness their negative / positive impacts on society.					
TBC	Professional Practice	Analyse and apply organisational management theories and functions to a small or medium sized organisation or professional practice.	None	Compulsory	6	80	8
TBC	Work Integrated Learning (WIL) - Geomatics	Analyse and apply theoretical and practical competencies gained during the study programme in a 'real world' Geomatics environment.	Digital Terrain Modeling, Surveying 4, Cadastral Surveying 2	Compulsory	7	360	36
							Total Credits:56