DEPARTMENT OF GEOMATICS

Subject/module information (Overview of Syllabus)
The syllabus content is subject to change to accommodate industry changes. Please note: A more detailed syllabus is available at the department or in the study guide that is applicable to a particular subject. On 19 October 2016, the syllabus content was defined as follows:

A

ADJUSTMENT OF ERRORS III (AJE301T)
Subject custodian: Department of Geomatics
1 X 3-HOUR PAPER

CADAstral SURVEYING III (CSU301T)
Subject custodian: Department of Geomatics
1 X 3-HOUR PAPER
Introduction to property law. Application of ACTS of Parliament directly and indirectly pertaining to Geomatics. Cadastral Surveying in practice. (Total tuition time: ± 120 hours)

CARTOGRAPHY III (CGH301T)
Subject custodian: Department of Geomatics
1 X 3-HOUR PAPER
Types of maps and their uses. Cartographic representation: colour. Map design: problems and control, purpose. Applications, analysis and interpretation of maps, international cartography. (Total tuition time: ± 100 hours)

COMMUNICATION SKILLS I (COS101T)
Subject custodian: Department of Applied Languages
CONTINUOUS ASSESSMENT
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 64 hours)

COMPUTER APPLICATIONS III (COA301T)
Subject custodian: Department of Geomatics
CONTINUOUS ASSESSMENT
Program writing and program development in a high-level language (e.g. Visual Basic, C++), subroutines, functions, files. Applications: use of software for project assignments. Database management systems: MS Access, manipulation of data. (Total tuition time: ± 120 hours)

COMPUTER SKILLS I (CSK101G)
Subject custodian: Department of Geomatics
CONTINUOUS ASSESSMENT
Components of a microcomputer system. Engineering applications of software. Managing personal computers. Word-processing, spreadsheets, presentations and databases. (Total tuition time: ± 120 hours)

CONTROL SURVEYING: PROJECT III (CSJ300T)
Subject custodian: Department of Geomatics
PROJECT ASSESSMENT
Instrument checks and adjustments. Observation reductions for distances. Random and systematic errors: slope, ppm, mean sea level, projection, zero error, least squares. Observation reduction for directions: RO, t-T. Observation techniques: eccentric observations, forced centering. Accuracy and fast traversing conditions, trigonometric heighting. Engineering geomatics techniques: setting out of horizontal circular, transition compound and reverse curves and vertical curves. (Total tuition time: ± 120 hours)

D

DRAWING I (DRW101B)
Subject custodian: Department of Geomatics
CONTINUOUS ASSESSMENT
Engineering Drawing standards: points, lines, form, lettering. Projections: orthographic, perspective (oblique and isometric). Topographical and cadastral drawing. (Total tuition time: ± 100 hours)
FINANCIAL MANAGEMENT (FMN141T)  
1 X 3-HOUR PAPER (OPEN BOOK)  
*Subject custodian: Department of Geomatics*  
Costing, budgeting, cash flow, current value, inflation and building up of hire rates. (Total tuition time: ± 100 hours)

GEODESY IV (GED401T)  
CONTINUOUS ASSESSMENT  
*Subject custodian: Department of Geomatics*  
Introduction to spherical astronomy. Transformation of two-dimensional coordinates. Coordinate systems and rotations in 3D. Terrestrial versus geodetic coordinate systems, geodetic surveying principles. Principles of global navigation satellite systems (GNSS), including global positioning systems (GPS), global navigation satellite systems (GLONASS), Galileo (European Union), Compass/Beidou (China), etc. Gravimetry and gravity field of the Earth. (Total tuition time: ± 200 hours)

GEOGRAPHIC INFORMATION SYSTEMS III (GIS301T)  
1 X 3-HOUR PAPER  
*Subject custodian: Department of Geomatics*  
Fundamentals of GIS. Spatial concepts. Spatial data. GIS hardware and software. Data input. Data analysis. GIS output. Data modeling and spatial analysis. Practical applications of GIS. (Total tuition time: ± 100 hours)

GEOGRAPHIC INFORMATION SYSTEMS IV (GIS401T)  
CONTINUOUS ASSESSMENT  
*Subject custodian: Department of Geomatics*  
Nature of geo-referenced information. Uses, advantages and disadvantages. Data capturing and manipulation techniques. Presentation and management of information. Applications. (Total tuition time: ± 150 hours)

GEOGRAPHY I (GEG111T)  
1 X 3-HOUR PAPER  
*Subject custodian: Department of Geomatics*  

GEOMETRIC DESIGN IV (GDE401T)  
1 X 4-HOUR PAPER (OPEN BOOK)  
*Subject custodian: Department of Civil Engineering*  
Principles and practice of road alignment, environmental impact control, design control and criteria, elements of design (geometric, safety), intersection and interchange design, drainage design, earthworks design, design project. (Total tuition time: ± 32 hours)

MANAGEMENT: CIVIL I (MNC101T)  
1 X 3-HOUR PAPER  
*Subject custodian: Department of Civil Engineering*  
Composition of the civil engineering industry. Types of contracts, tenders, management principles, productivity. Office and site administration, quality control. Elementary economics and financial accounting. (Total tuition time: ± 45 hours)

MAP PROJECTIONS II (MPJ201T)  
1 X 3-HOUR PAPER  
*Subject custodian: Department of Geomatics*  
Introduction: the shape of the earth, isostasy, geoid, spheroid. Mathematical deductions from selected map projections. Conical projections and cylindrical projections. (Total tuition time: ± 100 hours)

MATHEMATICS I (MAT171T)  
1 X 3-HOUR PAPER  
*Subject custodian: Department of Mathematics and Statistics*  
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 60 hours)
MATHEMATICS II (MAT271B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)
Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination). (Total tuition time: ± 60 hours)

PHOTOGRAMMETRY II (PHO211T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Geomatics)
Applications, geometry of vertical photos, stereocopy, parallax, optics, cameras. Mapping - the approximate solution, elementary flight planning. (Total tuition time: ± 120 hours)

PHOTOGRAMMETRY III (PHO331T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Geomatics)
Rectification of aerial photos, terrestrial photogrammetry, photo control for aerial triangulation. Photogrammetric flight planning project. (Total tuition time: ± 100 hours)

PHYSICS ID (PHU161E) 1 X 3-HOUR PAPER
(Subject custodian: Department of Physics)
Basic mathematics for physics, measurements, classical mechanics – force and Newton’s laws of motion, basic rotational motion, gravitation, torque, heat, wave motion, sound, electromagnetic waves, geometric optics – light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference and diffraction. Laser: Simple theory, types and applications. Practical work. (Total tuition time: ± 80 hours)

PRACTICE MANAGEMENT IV (PMN411T) 1 X 4-HOUR PAPER (OPEN BOOK)
(Subject custodian: Department of Management and Entrepreneurship)
The behavioural science approach to organisation. Motives and motivation. Some theories and studies of human behaviour, with specific reference to behaviour. Principles and practice of management. (Total tuition time: ± 30 hours)

PROJECT MANAGEMENT: SURVEYING IV (PUY401T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
A number of industry-orientated tasks based on a sound investigation, a comprehensive report on the analysis and solution or completion of the task must be submitted. The tender process. (Total tuition time: ± 150 hours)

RESEARCH METHODOLOGY (RMD101L) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
Research planning and design. The research report, hypothesis testing, report formats. (Total tuition time: ± 100 hours)

STATISTICS I (STA111T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)
Descriptive and inferential statistics, standard deviations, regression, correlation, z- and t-tests, modulus, medians, variance frequency, histogram. (Total tuition time: ± 96 hours)

STEREO MAPPING III (SMI301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Geomatics)
Mapping – the precise solution, orientations, photo control, aerial triangulation methods, stereo mapping from space borne platforms. (Total tuition time: ± 100 hours)

SURVEY DRAWING II (SUD211T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
Compilation and plotting of grids and graticule, topographic plans, plotting, scales, symbols. The production of longitudinal cross sections and mass haul diagrams. Cadastral drawings: erf diagrams, general plans, working plans, comparison diagrams, compilation plans. (Total tuition time: ± 100 hours)
SURVEYING IV (SUR411T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Geomatics)*  
Instrumentation for precise surveying, application of spherical trigonometry to theodolite errors, effects and corrections of theodolite and level errors. Error analysis of EDM measurements, EDM calibration. Observation and calculation methods of precise surveying, detection and monitoring of movements, absolute and relative, application of least squares to analysis and design survey networks. (Total tuition time: ± 200 hours)

SURVEYING: GEOMETRIC III (SUR33YT) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Geomatics)*  
Curves: horizontal - calculation of geometric and setting out data and coordinates of points on the curve. Different set-out methods. Transition curves. Vertical curve theory. (Total tuition time: ± 80 hours)

SURVEYING: PRACTICAL I (SUR11ZT) PROJECT ASSESSMENT  
*(Subject custodian: Department of Geomatics)*  
Setting up and levelling of the level and theodolite. Taking levelling readings and compiling the field book, testing and adjusting the different levelling instruments, testing and adjusting the theodolite, distance measurement with a tape, individual levelling line of at least 600 m and testing it, levelling of longitudinal section of at least 300 m and the transverse sections at every 20 m interval in group context. Individual traverse with at least three legs. Calculation and correction of traverse, topographic surveying of demarcated area. Drawing a plan and interpreting the contours. (Total tuition time: ± 40 hours)

SURVEYING: PRACTICAL II (SUR21ZT) PROJECT ASSESSMENT  
*(Subject custodian: Department of Geomatics)*  
Staking out roads that include a simple curve. Levelling of the longitudinal and cross sections. Setting out of profile and batters of intersection and resection. (Total tuition time: ± 40 hours)

SURVEYING: PRECISE III (SUR33XT) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Geomatics)*  

SURVEYING: THEORY I (SUR11YT) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Geomatics)*  
Basic surveying principles, surveying, testing and adjustment of instrument errors, traverse, levelling of longitudinal and cross sections. Areas and volumes for excavations and filling. South African coordinate system. Calculation of joins and polars and corrections to tape measurements. (Total tuition time: ± 80 hours)

SURVEYING: THEORY II (SUR21WT) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Geomatics)*  

SURVEYING: THEORY III (SUR33WT) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Geomatics)*  

TOWN PLANNING IV (TPN401T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Geomatics)*  
Historical perspective, modern trends. Land use: major land uses, land-use relationships, zoning. Township design: urban, local, residential layouts, informal settlements. Planning law and procedure, ordinances, etc. (Total tuition time: ± 100 hours)
WORK-INTEGRATED LEARNING I (EXP1SUR)  WORK-INTEGRATED LEARNING II (EXP2SUR)
(Subject custodian: Department of Geomatics)

To meet the requirements of the National Diploma, students must complete applicable Work-Integrated Learning, which will be evaluated by the department. (Total tuition time: six months)