Subject 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.

A

ADJUSTMENT OF ERRORS III (AJE301T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

C

CADASTRAL SURVEYING III (CSU301T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
Introduction to property law. Application of ACTS of Parliament directly and indirectly pertaining to Geomatics. Cadastral Surveying in practice. (Total tuition time: ± 80 hours)

CARTOGRAPHIC TECHNIQUES: PRACTICAL III (CGQ30YT)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
A cartographic project that reflects cartographic knowledge. Compilation of project in the form of an atlas. (Total tuition time: ± 96 hours)

CARTOGRAPHIC TECHNIQUES: THEORY III (CGQ30XT)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
Sources of data, compilation. Image forming, cartographic materials, cartographic and photo-mechanical equipment (uses and care). Cartographic systems. Cartographic production. Revision methods. Copyright legislation. (Total tuition time: ± 64 hours)

CARTOGRAPHY III (CGH301T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
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: ± 80 hours)

COMMUNICATION SKILLS I (COS101T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Applied Languages)
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)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
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: ± 96 hours)

COMPUTER SKILLS I (CSK101G)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
Components of a microcomputer system. Engineering applications of software. Managing personal computers. Word-processing, spreadsheets, presentations and databases. (Total tuition time: ± 64 hours)

CONTROL SURVEYING: PROJECT III (CSJ300T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)
<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
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<tr>
<td><strong>D</strong></td>
<td><strong>CONTINUOUS ASSESSMENT</strong></td>
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<tr>
<td><strong>DRAWING I (DRW101B)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>Engineering Drawing standards: points, lines, form, lettering. Projections: orthographic, perspective (oblique and isometric). Topographical and cadastral drawing. (Total tuition time: ± 96 hours)</td>
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<td><strong>E</strong></td>
<td><strong>EXPERIENTIAL LEARNING</strong></td>
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<tr>
<td><strong>EXPERIENTIAL LEARNING I (EXP1CAR, EXP1SUR)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>To meet the requirements of the National Diploma, students must complete applicable experiential learning, which will be evaluated by the Department. (Total tuition time: 6 months)</td>
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<td><strong>F</strong></td>
<td><strong>1 X 3-HOUR PAPER (OPEN BOOK)</strong></td>
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<tr>
<td><strong>FINANCIAL MANAGEMENT (FMN141T)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>Costing, budgeting, cash flow, current value, inflation and building up of hire rates. (Total tuition time: ± 30 hours)</td>
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<td><strong>G</strong></td>
<td><strong>CONTINUOUS ASSESSMENT</strong></td>
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<tr>
<td><strong>GEODESY IV (GED401T)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>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: ± 30 hours)</td>
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<tr>
<td><strong>GEOGRAPHIC INFORMATION SYSTEMS III (GIS301T)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>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: ± 30 hours)</td>
</tr>
<tr>
<td><strong>GEOGRAPHIC INFORMATION SYSTEMS IV (GIS401T)</strong>&lt;br <em>(Subject custodian: Department of Geomatics)</em></td>
<td>Nature of geo-referenced information. Uses, advantages and disadvantages. Data capturing and manipulation techniques. Presentation and management of information. Applications. (Total tuition time: ± 30 hours)</td>
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<tr>
<td><strong>GEOMETRIC DESIGN IV (GDE401T)</strong>&lt;br <em>(Subject custodian: Department of Civil Engineering)</em></td>
<td>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)</td>
</tr>
<tr>
<td><strong>MANAGEMENT: CIVIL I (MNC101T)</strong>&lt;br <em>(Subject custodian: Department of Civil Engineering)</em></td>
<td>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)</td>
</tr>
</tbody>
</table>
MAP PROJECTIONS II (MPJ201T)  
*(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: ± 80 hours)

MATHMATICS I (MAT171T)  
*(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)

MATHMATICS II (MAT271B)  
*(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)

PHOTOMETRY II (PHO211T)  
*(Subject custodian: Department of Geomatics)*

Applications, geometry of vertical photos, stereocopy, parallax, optics, cameras. Mapping - the approximate solution, elementary flight planning. (Total tuition time: ± 80 hours)

PHOTOMETRY III (PHO331T)  
*(Subject custodian: Department of Geomatics)*

Rectification of aerial photos, terrestrial photogrammetry, photo control for aerial triangulation. Photogrammetric flight planning project. (Total tuition time: ± 80 hours)

PHYSICS I (PHU161E)  
*(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)  
*(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)  
*(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: ± 30 hours)

RESEARCH METHODOLOGY (RMD101L)  
*(Subject custodian: Department of Geomatics)*

Research planning and design. The research report, hypothesis testing, report formats. (Total tuition time: ± 30 hours)

STATISTICS I (STA111T)  
*(Subject custodian: Department of Mathematics and Statistics)*

Descriptive and inferential statistics, standard deviations, regression, correlation, z- and t-tests, modus, medians, variance frequency, histogram. (Total tuition time: ± 96 hours)
STEREO MAPPING III (SMI301T)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
Mapping – the precise solution, orientations, photo control, aerial triangulation methods, stereo mapping from space borne platforms. (Total tuition time: ± 80 hours)

SURVEY DRAWING II (SUD211T)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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: ± 80 hours)

SURVEYING IV (SUR411T)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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: ± 30 hours)

SURVEYING: CONTROL II (SUR21XT)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
South African map series, cadastral information. Higher order control techniques: intersections, resections and Global Navigation Satellite Systems. (Total tuition time: ± 64 hours)

SURVEYING: ENGINEERING II (SUR21YT)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
EDM and lasers. Levelling, setting out profiles and batters, horizontal curve calculations and setting out procedures. (Total tuition time: ± 45 hours)

SURVEYING: GEOMETRIC III (SUR33YT)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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: ± 100 hours)

SURVEYING: PRACTICAL II (SUR21ZT)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  

SURVEYING: THEORY I (SUR11YT)  
*Subject custodian: Department of Geomatics*  
CONTINUOUS ASSESSMENT  
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: ± 64 hours)
SURVEYING: THEORY II (SUR21WT)  
*(Subject custodian: Department of Geomatics)*  

SURVEYING: THEORY III (SUR33WT)  
*(Subject custodian: Department of Geomatics)*  

TOWN PLANNING IV (TPN401T)  
*(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: ± 30 hours)