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. On 4 September 2014, syllabus content was defined as follows:

A

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<thead>
<tr>
<th>Subject</th>
<th>Description</th>
<th>Total tuition time</th>
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C

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<th>Subject</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>CADASTRAL SURVEYING III (CSU301T)</td>
<td>Introduction to property law. Application of ACTS of Parliament directly and indirectly pertaining to Geomatics. Cadastral Surveying in practice.</td>
<td>± 80 hours</td>
</tr>
<tr>
<td>CARTOGRAPHY III (CGH301T)</td>
<td>Types of maps and their uses. Cartographic representation: colour. Map design: problems and control, purpose. Applications, analysis and interpretation of maps, international cartography.</td>
<td>± 80 hours</td>
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<tr>
<td>DRAWING I (DRW101B)</td>
<td>Engineering Drawing standards: points, lines, form, lettering. Projections: orthographic, perspective (oblique and isometric). Topographical and cadastral drawing.</td>
<td>± 96 hours</td>
</tr>
</tbody>
</table>
### EXPERIENTIAL LEARNING I (EXP1SUR)  
**Subject custodian:** Department of Geomatics  
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)

### FINANCIAL MANAGEMENT (FMN141T)  
**Subject custodian:** Department of Geomatics  
Costing, budgeting, cash flow, current value, inflation and building up of hire rates. (Total tuition time: ± 30 hours)

### GEODESY IV (GED401T)  
**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: ± 30 hours)

### GEOGRAPHIC INFORMATION SYSTEMS III (GIS301T)  
**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: ± 30 hours)

### GEOGRAPHIC INFORMATION SYSTEMS IV (GIS401T)  
**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: ± 30 hours)

### GEOGRAPHY I (GEG111T)  
**Subject custodian:** Department of Geomatics  

### GEOMETRIC DESIGN IV (GDE401T)  
**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)  
**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)  
**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)
<table>
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<tr>
<th>Course Code</th>
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<th>Credits</th>
<th>Duration</th>
<th>Subject Custodian</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT171T</td>
<td>Mathematics I</td>
<td>1</td>
<td>3 hours paper</td>
<td>Department of Mathematics and Statistics</td>
<td>Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 60 hours)</td>
</tr>
<tr>
<td>MAT271B</td>
<td>Mathematics II</td>
<td></td>
<td>Continuous</td>
<td>Department of Mathematics and Statistics</td>
<td>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)</td>
</tr>
<tr>
<td>PHO211T</td>
<td>Photogrammetry II</td>
<td>1</td>
<td>3 hours paper</td>
<td>Department of Geomatics</td>
<td>Applications, geometry of vertical photos, stereocopy, parallax, optics, cameras. Mapping - the approximate solution, elementary flight planning. (Total tuition time: ± 80 hours)</td>
</tr>
<tr>
<td>PHO331T</td>
<td>Photogrammetry III</td>
<td>1</td>
<td>3 hours paper</td>
<td>Department of Geomatics</td>
<td>Rectification of aerial photos, terrestrial photogrammetry, photo control for aerial triangulation. Photogrammetric flight planning project. (Total tuition time: ± 80 hours)</td>
</tr>
<tr>
<td>PHU161E</td>
<td>Physics ID</td>
<td></td>
<td>Continuous</td>
<td>Department of Physics</td>
<td>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)</td>
</tr>
<tr>
<td>PMN411T</td>
<td>Practice Management IV</td>
<td>1</td>
<td>4 hours paper</td>
<td>Department of Management and Entrepreneurship</td>
<td>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)</td>
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<tr>
<td>PUY401T</td>
<td>Project Management: Surveying IV</td>
<td></td>
<td>Continuous</td>
<td>Department of Geomatics</td>
<td>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)</td>
</tr>
<tr>
<td>RMD101L</td>
<td>Research Methodology</td>
<td></td>
<td>Continuous</td>
<td>Department of Geomatics</td>
<td>Research planning and design. The research report, hypothesis testing, report formats. (Total tuition time: ± 30 hours)</td>
</tr>
<tr>
<td>STA111T</td>
<td>Statistics I</td>
<td></td>
<td>Continuous</td>
<td>Department of Mathematics and Statistics</td>
<td>Descriptive and inferential statistics, standard deviations, regression, correlation, z- and t-tests, modulus, medians, variance frequency, histogram. (Total tuition time: ± 96 hours)</td>
</tr>
<tr>
<td>SMI301T</td>
<td>Stereogrammetry III</td>
<td>1</td>
<td>3 hours paper</td>
<td>Department of Geomatics</td>
<td>Mapping – the precise solution, orientations, photo control, aerial triangulation methods, stereo mapping from space borne platforms. (Total tuition time: ± 80 hours)</td>
</tr>
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</table>
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: GEOMETRIC III (SUR33YT)  
(Subject custodian: Department of Geomatics)  
1 X 3-HOUR PAPER
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)  
PRACTICAL
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)  
PRACTICAL
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)  
1 X 3-HOUR PAPER

SURVEYING: THEORY I (SUR11YT)  
(Subject custodian: Department of Geomatics)  
1 X 3-HOUR PAPER
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)  
1 X 3-HOUR PAPER

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