

## NATIONAL DIPLOMA: GEOLOGY

### Qualification code: NDGE04 - NQF Level 6

Campus where offered: Arcadia Campus (day classes)  
Last year of new intake: 2018  
Teach-out (phase-out) date: 31 December 2022

Students registered for this qualification should complete their studies according to the teach-out date prescribed for the qualification, subject to the stipulations of Regulation 3.1.11 and 3.1.13 in the Students' Rules and Regulations.

Information on phased-out programmes can be obtained from the TUT website, [www.tut.ac.za](http://www.tut.ac.za).

### CURRICULUM

Consult the 2018 Faculty Prospectus for the full contents of the qualification.

#### FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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##### FIRST SEMESTER

CHE141B	Chemistry IA	(0,100)	
CSK101B	Computer Skills I	(0,050)	
GEO151T	Geology I	(0,100)	
MAT171T	Mathematics I	(0,100)	
PHU161B	Physics IA	(0,100)	

TOTAL CREDITS FOR THE SEMESTER: 0,450

##### SECOND SEMESTER

AGL111T	Applied Geology I	(0,100)	Geology I
GET111T	Geotechniques I	(0,100)	Geology I
MRL101T	Mineralogy I	(0,100)	Chemistry IA
SGE101T	Structural Geology I	(0,100)	Geology I
STA111B	Statistics I	(0,075)	Mathematics I

**plus one of the following subjects:**

EPS131T	Entrepreneurial Skills I	(0,075)	
MAT271T	Mathematics II	(0,075)	Mathematics I

TOTAL CREDITS FOR THE SEMESTER: 0,550

TOTAL CREDITS FOR THE FIRST YEAR: **1,000**

#### SECOND YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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##### FIRST SEMESTER

AGL211T	Applied Geology II	(0,100)	Applied Geology I
GEO251T	Geology II	(0,100)	Geology I
GET211T	Geotechniques II	(0,100)	Structural Geology I Geotechniques I
GPH211T	Geophysics II	(0,100)	Physics IA



PET211T Petrology II (0,100) Mineralogy I

TOTAL CREDITS FOR THE SEMESTER: 0,500

### SECOND SEMESTER

GTH201T Geotechnology II (0,500) Applied Geology II  
Geology II  
Geophysics II  
Geotechniques II  
Petrology II

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE SECOND YEAR: **1,000**

### THIRD YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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#### FIRST SEMESTER

IGE101T Industrial Geology I (offered in both semesters) (0,500)

TOTAL CREDITS FOR THE SEMESTER: 0,500

#### SECOND SEMESTER

ENG301T Engineering Geology III (0,125) Geotechnology II

GPH311T Geophysics III (0,125) Geophysics II

HGE301T Hydrogeology III (0,125) Geotechnology II

MEG301T Mining and Exploration Geology III (0,125) Geotechnology II

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**

TOTAL CREDITS FOR THE QUALIFICATION: **3,000**

### SUBJECT INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular subject. On 01 August 2018, the syllabus content was defined as follows:

#### A

#### APPLIED GEOLOGY I (AGL111T) **1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Introductory geophysics. Introductory hydrogeology. Introductory engineering geology. (Total tuition time: ± 60 hours)

#### APPLIED GEOLOGY II (AGL211T) **1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

South African stratigraphy and mineral deposits. (Total tuition time: ± 68 hours)



**C****CHEMISTRY IA (CHE141B)****1 X 3-HOUR PAPER****(Subject custodian: Department of Chemistry)**

Atomic structure, chemical bonding, periodic table of elements and nomenclature of inorganic compounds. Chemical equations and reactions and stoichiometry. Solutions, acids, bases, pH calculations and chemical equilibrium. Electrochemistry and redox reactions. Introduction to organic compounds (nomenclature and functional groups). Practical: experiments based on the theory, with the emphasis on basic laboratory techniques. (Total tuition time: ± 152 hours)

**COMPUTER SKILLS I (CSK101B)****CONTINUOUS ASSESSMENT****(Subject custodian: End User Computing Unit)**

Students have to acquire theoretical knowledge (computing fundamentals) and practical skills as an end-user in operating systems and MS Office Suite applications (MS Word, MS Excel and MS PowerPoint) on an introductory level. Students will do online and computer based tests. The modules are mapped with SAQA and IC3 Essential Skills for Digital Literacy (international certification). (Total tuition time: ± 40 hours)

**E****ENGINEERING GEOLOGY III (ENG301T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Rock material and rock mass, engineering geology of soils, introduction to rock mechanics, introduction to soil mechanics, engineering-geological investigation methods, the engineering geology of South African rock types. (Total tuition time: ± 77 hours)

**ENTREPRENEURIAL SKILLS I (EPS131T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Management and Entrepreneurship)**

Types of businesses. Management functions. Planning, organising, leading, control. Budgeting. Accounting. Administration. Banking. Personnel management. Customer relations. (Total tuition time: not available)

**G****GEOLOGY I (GEO151T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Introduction to earth sciences. Physical geology. Geomorphology. Pedology. Introduction to environmental geology. (Total tuition time: ± 104 hours for GEO141T and ± 120 hours for GEO151T)

**GEOLOGY II (GEO251T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Deformation process. (Total tuition time: ± 68 hours)

**GEOPHYSICS II (GPH211T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

The use of electrical resistivity, gravitation, the radiometric and electromagnetic methods in exploration and engineering geology. (Total tuition time: ± 156 hours)

**GEOPHYSICS III (GPH311T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

The use of borehole geophysics, induced polarisation methods and seismic methods in exploration and engineering geology. (Total tuition time: ± 180 hours)

**GEOTECHNIQUES I (GET111T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Maps, map projections and map scales, South African map series, compilation of geological profiles, compass mapping and field mapping. (Total tuition time: ± 60 hours)

**GEOTECHNIQUES II (GET211T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

The solving of three-dimensional structural problems, photogeology, field mapping with aerial photography, field mapping of intrusive and metamorphic rocks, the identification of minerals and rocks. (Total tuition time: ± 60 hours)



**GEOTECHNOLOGY II (GTH201T)****PROJECT ASSESSMENT**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Practical field projects. Practical laboratory projects. Report-writing. (Total tuition time: ± 240 hours)

**H****HYDROGEOLOGY III (HGE301T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Occurrence and movement of groundwater. Borehole construction. Testing. Hydrochemistry. (Total tuition time: ± 60 hours)

**I****INDUSTRIAL GEOLOGY I (IGE101T)****CONTINUOUS ASSESSMENT**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Work-integrated learning in the industry. (Total tuition time: not available)

**M****MATHEMATICS I (MAT171T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Mathematics and Statistics)*

Basic mathematics. Differentiation. Integration. Matrices. (Total tuition time: ± 90 hours)

**MATHEMATICS II (MAT271T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Mathematics and Statistics)*

Differentiation: logarithmic differentiation, implicit functions, the inverse of trigonometric functions, the hyperbolic functions, parametric functions, applications. Partial differentiation: first-order partial derivatives, small increments, rates of change, changing of the variables, errors. Integration: fundamental integration formulae, factor integration, partial fractions, hyperbolic functions, standard forms, applications. First-order differential equations: introduction and definitions, direct integration, separation of variables, exact equations, linear equations, Bernoulli's equation, applications. (Total tuition time: ± 120 hours)

**MINERALOGY I (MRL101T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Crystallography. Crystal chemistry, crystal physics and crystal optics. Systematic and descriptive mineralogy. Practical. (Total tuition time: ± 60 hours)

**MINING AND EXPLORATION GEOLOGY III (MEG301T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Terrestrial natural resources, ore petrology, economic geology of South African ore occurrences, mining and exploration geology. Remote sensing and GIS. (Total tuition time: ± 60 hours)

**P****PETROLOGY II (PET211T)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Environmental, Water and Earth Sciences)*

Igneous petrology. Metamorphic petrology. Sedimentary petrology. Practical. (Total tuition time: ± 120 hours)

**PHYSICS IA (PHU161B)****1 X 3-HOUR PAPER**

*(Subject custodian: Department of Physics)*

Basic mathematics for physics. Introduction to calculus-based physics. Measurements. Kinematics in 1D and 2D. Newton's laws of motion. Dynamics of uniform circular motion. Work energy and power. Impulse and momentum. Rotational kinematics and dynamics. Fluids, temperature and heat. The ideal gas law and kinetic theory. Electric forces and fields. Electric potential energy and the electric potential. Electric circuits. Reflection of light: mirrors, lenses and optical instruments. Practical experiments related to the theory with emphasis on measuring physical quantities. (Total tuition time: ± 90 hours)



**S****STATISTICS I (STA111B)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mathematics and Statistics)**

Introduction. Presentation of data. Statistical measures of position. Statistical measures of distribution. Moments and measures of asymmetry and kurtosis. Linear correlation and regression. Probability theory. (Total tuition time: not available)

**STRUCTURAL GEOLOGY I (SGE101T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Geological structures. Deformational processes. Practical. (Total tuition time: ± 60 hours)

