

## NATIONAL DIPLOMA: ENVIRONMENTAL SCIENCES (Extended curriculum programme with foundation provision) Qualification code: NDEVF0 - 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).

Key to asterisks:

\* Information does not correspond to information on AA72.  
(Deviations approved Senate in September 2015.)

### CURRICULUM

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

**SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.**

#### FIRST YEAR

| CODE    | SUBJECT                  | CREDIT  | PREREQUISITE SUBJECT(S) |
|---------|--------------------------|---------|-------------------------|
| FPCLS01 | Chemistry IB: Extended   | (0,165) |                         |
| FPMLS01 | Mathematics IB: Extended | (0,120) |                         |
| FPPLS01 | Physics IB: Extended     | (0,165) |                         |

#### FIRST SEMESTER

|                |  |         |  |
|----------------|--|---------|--|
| CSK101B        | Computer Skills I                            | (0,075) |  |
| <b>ERS101T</b> | <b>Environmental Resources I</b>             |         |  |
| ERS10XT        | Environmental Resources: Ecosystem Ecology I | (0,100) |  |
| FPENG05        | Foundation English                           | (0,075) |  |

#### SECOND SEMESTER

|                |                                     |         |  |
|----------------|-------------------------------------|---------|--|
| COS101T        | Communication Skills I              | (0,075) |  |
| <b>EMG101T</b> | <b>Environmental Management I</b>   |         |  |
| EMG10XT        | Environmental Management: General I | (0,100) |  |

TOTAL CREDITS FOR THE FIRST YEAR: **0,875**

#### SECOND YEAR

| CODE    | SUBJECT                      | CREDIT  | PREREQUISITE SUBJECT(S) |
|---------|------------------------------|---------|-------------------------|
| EBY100T | Environmental Microbiology I | (0,100) |                         |

#### FIRST SEMESTER

|                |                                     |         |                                     |
|----------------|-------------------------------------|---------|-------------------------------------|
| ELE201T        | Environmental Legislation           | (0,100) |                                     |
| <b>EMG101T</b> | <b>Environmental Management I</b>   |         |                                     |
| EMG10YT        | Environmental Management: Applied I | (0,100) | Environmental Management: General I |



|                |   |         |  |
|----------------|---|---------|--|
| <b>ERS101T</b> | <b>Environmental Resources I</b>              |         |  |
| ERS10YT        | Environmental Resources: Population Ecology I | (0,100) | Environmental Resources: Ecosystem Ecology I |
| GEO141T        | Geology I                                     | (0,100) |  |

## SECOND SEMESTER

|         |                             |         |                            |
|---------|-----------------------------|---------|----------------------------|
| AGL111T | Applied Geology I           | (0,100) | Geology I                  |
| EMG201T | Environmental Management II | (0,100) | Environmental Management I |
| ENC201T | Environmental Chemistry II  | (0,100) | Chemistry IB: Extended     |
| ERS201T | Environmental Resources II  | (0,100) | Environmental Resources I  |

TOTAL CREDITS FOR THE SECOND YEAR: **0,900**

## THIRD YEAR

| CODE | SUBJECT | CREDIT | PREREQUISITE SUBJECT(S) |
|------|---------|--------|-------------------------|
|------|---------|--------|-------------------------|

### FIRST SEMESTER

|         |                                  |         |                             |
|---------|----------------------------------|---------|-----------------------------|
| EEC201T | Environmental Economy            | (0,100) |                             |
| EMG301T | Environmental Management III     | (0,100) | Environmental Management II |
| EMS201T | Environmental Management Systems | (0,100) | Environmental Management II |
| ENC301T | Environmental Chemistry III      | (0,100) | Environmental Chemistry II  |

TOTAL CREDITS FOR THE SEMESTER: 0,400

### SECOND SEMESTER

|         |                                |         |                              |
|---------|--------------------------------|---------|------------------------------|
| AGL211B | Applied Geology II             | (0,100) | Applied Geology I            |
| EMB201T | Environmental Biotechnology II | (0,100) | Environmental Microbiology I |
| ERS301T | Environmental Resources III    | (0,100) | Environmental Resources II   |
| IPO301T | Industrial Processes III       | (0,100) | Environmental Chemistry II   |
|         |                                |         | Physics IB: Extended         |
| RMD101U | Research Methodology           | (0,100) | Mathematics IB: Extended     |

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: **0,900**

## FOURTH YEAR

**On completion of the above subjects. If a student has one subject outstanding such a case will be reviewed and permission might be granted in collaboration with a specific employer.**

| CODE | SUBJECT | CREDIT | PREREQUISITE SUBJECT(S) |
|------|---------|--------|-------------------------|
|------|---------|--------|-------------------------|

### FIRST OR SECOND SEMESTER

|         |                             |         |  |
|---------|-----------------------------|---------|--|
| EXP1EMN | Work-Integrated Learning I* | (0,325) |  |
|---------|-----------------------------|---------|--|

TOTAL CREDITS FOR THE FOURTH YEAR: **0,325**

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 (AGL211B)** **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 IB: EXTENDED (FPCLS01)** **1 X 3-HOUR PAPER**  
(*Subject custodian: Department of Chemistry*)  
Scientific methodology and its use in discovering chemistry. Numbers in chemistry. The use of SI units. Matter. Atomic structure. Compounds in chemistry. The mole concept and chemical calculations. The electronic structure of the atom and electronic configurations within the periodic table. Chemical bonding. The states of matter and the binding forces within matter. Basic concepts of the gas laws. Solutions in chemistry. Acids, bases and salts. Oxidation and reduction and the balancing of equations. Organic chemistry: introduction, alkanes, alkenes, aromates, alkanols, phenols, halogen compounds, alkanoates, alkynes, aldehydes, ketones and alkanolic acids. (Total tuition time: ± 160 hours)

**COMMUNICATION SKILLS I (COS101T)** **CONTINUOUS ASSESSMENT**  
(*Subject custodian: Department of Applied Languages*)  
Communication theory. Oral presentation. Technical writing skills. Group communication skills. (Total tuition time: not available)

**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

**ENVIRONMENTAL BIOTECHNOLOGY II (EMB201T)** **1 X 3-HOUR PAPER**  
(*Subject custodian: Department of Biotechnology and Food Technology*)  
The different ecospheres that house organisms, their role in cycling in nature and the uses of micro-organisms to treat wastewater and xenobiotics. Harnessing organisms for mining and extraction of oil as well as remediation of oil spills. (Total tuition time: ± 40 hours)

**ENVIRONMENTAL CHEMISTRY II (ENC201T)** **1 X 3-HOUR PAPER**  
(*Subject custodian: Department of Chemistry*)  
Chemical fate and transport, industrial ecology, aquatic chemistry, including water analysis, sources of water pollution and water treatment methods. Chemical analysis of water and wastewaters. Toxicological chemistry. Practical: experimental techniques related to the theory. (Total tuition time: ± 96 hours)



- ENVIRONMENTAL CHEMISTRY III (ENC301T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Chemistry)**  
 The geosphere and geochemistry: rock cycle, sediment transport and pollution issues relating to the geosphere. Soil chemistry: composition of soil and chemical reactions that may occur in soil. Atmospheric chemistry: atmospheric physical and chemical processes, particularly the photochemical process, as well as various effects from dispersion of pollutants, sampling and analytical methods relating to atmospheric or gaseous samples. Waste: nature and sources of waste, waste minimisation at source, disposal of waste, hazardous waste, nuclear waste and agricultural chemicals. Waste and solids analysis: methods for sampling and analysis of solid environmental samples including wastes. Practical: experimental techniques related to the theory. (Total tuition time: ± 96 hours)
- ENVIRONMENTAL ECONOMY (EEC201T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Introductory economy. Sociopolitical factors. Resource economy. Quantification of environmental risks. Environmental and economical problems and situation criteria. (Total tuition time: ± 42 hours)
- ENVIRONMENTAL LEGISLATION (ELE201T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Framework of environmental law. South African legal process. Nature and scope of national, provincial and local legislation. Implementation of specific laws. Environmental impact assessment, environmental management programme. International environmental legislation and standards. International conventions and treaties. Green organisations. Quantification of legal risks. (Total tuition time: ± 42 hours)
- ENVIRONMENTAL MANAGEMENT II (EMG201T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Production management. Life cycle analysis. Environmental finance and cost analysis. Industrial health. (Total tuition time: ± 30 hours)
- ENVIRONMENTAL MANAGEMENT III (EMG301T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Environmental management strategy. Environmental audit. Environmental monitoring. Integrated environmental management. (Total tuition time: ± 42 hours)
- ENVIRONMENTAL MANAGEMENT: APPLIED I (EMG10YT)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Introduction to environmental management. Key environmental issues, air pollution, renewable energy, climate change, solid and hazardous waste. (Total tuition time: ± 30 hours)
- ENVIRONMENTAL MANAGEMENT: GENERAL I (EMG10XT)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Introduction to environmental management. Key environmental issues, human population and its impacts, water resources, food, soil and pest management. (Total tuition time: ± 30 hours)
- ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS201T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Environmental management philosophy. Formal management resources. Various uses of environmental systems. ISO 14000, BS 7750 and ERA. (Total tuition time: ± 45 hours)
- ENVIRONMENTAL MICROBIOLOGY I (EBY100T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Biotechnology and Food Technology)**  
 General introduction. Microscopy. Eucaryotes, procaryotes, viruses and protista. Microbial nutrition, growth and culture media. Sterilisation and control of micro-organisms (chemical, physical and microbial control). Aseptic techniques and pure culture techniques. Basic terminology and principles of microbial metabolism. Practical microbiological techniques, including all the theoretical themes. (Total tuition time: ± 248 hours)
- ENVIRONMENTAL RESOURCES II (ERS201T)** **1 X 3-HOUR PAPER**  
**(Subject custodian: Department of Environmental, Water and Earth Sciences)**  
 Environmental quality: air pollution, water pollution, solid waste, pesticides, radiation, noise. Waste management. Waste: rational use reduces waste, renewal techniques, recycling. Risk management: identifying potential risks, dealing with risks. (Total tuition time: ± 30 hours)



**ENVIRONMENTAL RESOURCES III (ERS301T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Climate studies: the South African climate, urban climate, factors that have an impact on climate. Particular environmental features: mountains, rivers, the coastal zone. Indications of environmental concerns: unofficial indicators, official indicators. (Total tuition time: ± 45 hours)

**ENVIRONMENTAL RESOURCES: ECOSYSTEM ECOLOGY I (ERS10XT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

General ecology: the purpose of the study of ecology, organisation of the ecosystem, ecological pyramids and population interactions. Renewable resources: soil, wild animals, freshwater systems, marine systems. Non-renewable resources: terrestrial minerals, offshore minerals. (Total tuition time: ± 45 hours)

**ENVIRONMENTAL RESOURCES: POPULATION ECOLOGY I (ERS10YT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

General ecology: the purpose of the study of ecology, organisation of the ecosystem, ecological pyramids and population interactions. Renewable resources: soil, wild animals, freshwater systems, marine systems. Non-renewable resources: terrestrial minerals, offshore minerals. (Total tuition time: ± 45 hours)

**F****FOUNDATION ENGLISH (FPENG05)****1 X 3-HOUR PAPER****(Subject custodian: Department of Applied Languages)**

Interpret, relate and reflect on all available and relevant resource material in proper English. Communicate orally in a comprehensible and clear manner in both general and subject-specific communication. Demonstrate intermediate-level of proficiency in written English. (Total tuition time: ± 160 hours)

**G****GEOLOGY I (GEO141T)****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)

**I****INDUSTRIAL PROCESSES III (IPO301T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Different types of industries and processes. Alternative technologies. Waste management. (Total tuition time: ± 60 hours)

**M****MATHEMATICS IB: EXTENDED (FPMLS01)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mathematics and Statistics)**

Arithmetic. Graphs. Functions. Basic algebra. Trigonometry. Differentiation. Mensuration. Basic statistics. (Total tuition time: ± 190 hours)

**P****PHYSICS IB: EXTENDED (FPPLS01)****1 X 3-HOUR PAPER****(Subject custodian: Department of Physics)**

A general physics qualification with applications in the biological sciences: remedial mathematics, fundamental units, vectors and scalars, kinetics, mechanics, dynamics, momentum, work, energy and power, fluids, temperature and heat, gas laws, waves and sound, optics, electricity, magnetism, radioactivity. Practical: experiments related to the theory. (Total tuition time: ± 160 hours)



**R****RESEARCH METHODOLOGY (RMD101U)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mathematics and Statistics)**

Descriptive statistics: graphical presentation of quantitative and qualitative data, measures of location and dispersion. Basic probability theory and probability distributions. Inferential statistics: estimation and hypothesis testing for means and proportions, regression and correlation. (Total tuition time:  $\pm$  50 hours)

**W****WORK-INTEGRATED LEARNING I (EXP1EMN, EXP1GEO)****WORK-INTEGRATED LEARNING****(Subject custodian: Department of Environmental, Water and Earth Sciences)**

Syllabus content not available. Please contact the Head of the Department.

