

NATIONAL DIPLOMA: ENVIRONMENTAL SCIENCES

(Extended curriculum programme with foundation provision)

Qualification code: NDEVF0 - NQF Level 6

Campus where offered: Arcadia Campus

Important notification to new applicants:

Students who intend to enrol for this qualification for the first time in 2017 or thereafter, should note that it will not be possible to continue with any Baccalaureus Technologiae as from 2020, since it is being replaced by qualifications aligned with the newly-implemented Higher Education Qualification Sub-Framework. Potential students are advised to consult the University's website for any new qualifications which might not be published in this Prospectus.

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR APPLICANTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with a D symbol at Standard Grade or an E symbol at Higher Grade for English, Mathematics and Physical Science.

Recommended subject(s):

Biology and Geography.

Selection criteria:

Applicants who meet the minimum requirements will be invited to do an academic proficiency test. The applicants' performance in the Senior Certificate will contribute 80% to the final admission score and the academic proficiency test 20%. Applicants who pass the proficiency test will be shortlisted for selection by a departmental selection panel.

• **FOR APPLICANTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE IN OR AFTER 2008:**

Admission requirement(s):

A National Senior Certificate with a bachelor's degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 4 for Mathematics and 4 for Physical Sciences.

Recommended subject(s):

Geography and Life Sciences.

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least 21. Applicants will be selected by a departmental selection panel and shortlisted for selection.

Assessment procedures:

- Applicants with a score of 24 and more will be considered for admission.
- Applicants with a score of 21 to 23 will be invited to do an academic proficiency test. The APS will contribute 80% to the final admission score and the academic proficiency test, will contribute 20%.

b. *Minimum duration:*

Three and a half years.

c. *Presentation:*

Day classes.



- d. *Intake for the qualification:*
January only.
- e. *Exclusion and readmission, practicals, textbooks, personal protective equipment, projects and assignments, Recognition of Prior Learning (RPL), equivalence, status and Industrial Environmental Practice III (Work-Integrated Learning):*
See National Diploma: Environmental Sciences (NDEV02).
- f. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks:

- * Information does not correspond to information on AA72.
(Deviation approved by the Senate in September 2015.)

CURRICULUM

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)	
ERS101T	Environmental Resources I		
ERS10XT	Environmental Resources: Ecosystem Ecology I	(0,100)	
FPENG05	Foundation English	(0,075)	

SECOND SEMESTER

COS101T	Communication Skills I	(0,075)	
EMG101T	Environmental Management I		
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)	
EMG101T	Environmental Management I		
EMG10YT	Environmental Management: Applied I	(0,100)	Environmental Management: General I
ERS101T	Environmental Resources I		
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
RMD101U	Research Methodology	(0,100)	Physics IB: Extended 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/MODULE 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/module. On 01 August 2017, 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/Module 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)

GEOTECHNOLOGY I (GTH101T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Environmental, Water and Earth Sciences)*

The use of maps, aerial photographs and other satellite images in the earth sciences. Introduction to section drawings. Mapping techniques. (Total tuition time: ± 60 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: ± 50 hours)

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

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

