Universiteit Stellenbosch University
FACULTY of SCIENCE

DEPARTMENT OF EARTH SCIENCES

Undergraduate and Postgraduate Study

exploring and understanding planet Earth

www.sun.ac.za/earthsci

DEPARTMENT OF EARTH SCIENCES

Apply to study Earth Sciences at SU

UNDERGRADUATE: BACHELOR OF SCIENCE IN EARTH SCIENCE

STEP 1 Consult the Faculty of Science Yearbook and website (www.sun.ac.za/science) for the latest entrance requirements for Science Degrees at Stellenbosch University

STEP 2 Sit the National Benchmark Tests (NBT) including the Mathematics Component

STEP 3 Decide which stream you wish to register for

STEP 4 Apply online at www.maties.com

POSTGRADUATE: BSc HONOURS IN EARTH SCIENCE

STEP 1 Entrance to the honours year is extremely competitive. Consult the Faculty of Science Yearbook and website (www.sun.ac.za/science) for the latest entrance requirements. Although a 65% average for 3rd year geology modules is required for admission to the earth science honours programme, other factors may also be taken into account when considering students with a lower average and external applicants.

STEP 2 Contact the Honours Coordintor at eshonours@sun.ac.za

STEP 3 Apply online at http://www.sun.ac.za/pgstudies

STEP 4 Submit the application by the 1st of October the year preceeding study

POSTGRADUATE: MSc - MASTER OF SCIENCE or PhD - DOCTOR OF PHILOSOPHY

STEP 1 Contact a member of the academic staff to arrange a suitable project. Postgraduate students should develop their own project independently or in conjunction with a potential supervisor.

STEP 2 Compile the departmental application documents including internal application form following the guidelines at www.sun.ac.za/earthsci and contacting the postgraduate coordinator for the Department on espostgrad@sun.ac.za

STEP 3 Once permission has been granted from the Department to register for the MSc or PhD programme, the application is sent to the Faculty of Science for ratification

STEP 4 MSc students can register immediately, but PhD students require Faculty Board approval. Speak to your proposed supervisor regarding deadlines.

Dept Earth Sciences

Stellenbosch University
Private Bag X1
Matieland, 7602

Chamber of Mines Building
Cnr Ryneveld & Merriman St
Stellenbosch

www.sun.ac.za/earthsci
geology@sun.ac.za
+27 (0)21 808 3219

Mineralogy
nucleation and growth of minerals in a variety of contexts and their preservation in the rock record

Isotope Hydrology
the use of stable and radioactive isotopes to trace the movement and interaction of water bodies involved in the hydrological cycle

Experimental Petrology
the use of experiments to model the behaviour of minerals and rocks at different temperatures and pressures

Biogeochemistry
studying the interactions between chemical processes and the marine and terrestrial ecosystems

Tectonics
the study of large scale structural processes that control the movement of crustal plates across the surface of the planet

Economic Geology
the formation and characteristics of ore deposits (i.e., earth materials that are of economic or industrial interest)

Igneous Petrogenesis
the occurrence , field relationships, structural characteristics, mineralogy and geochemistry of igneous rocks as it pertains to their formation

Geochronology
the determination of the timescale of geological history through both absolute and relative dating methods

Metamorphic Petrology
the study of the mineralogy, textures and field relationships of metamorphic rocks and what they can tell us about their formation and evolution

Vertebrate Taphonomy
the transition of organic matter from the biosphere to the lithosphere (Earth's rock record).

What is Earth Science?

Earth Science applies the principles of physics, chemistry, biology and mathematics to study the formation and evolution of planet Earth. It uses the fundamental building blocks of our planet, minerals and rocks, to help us understand the composition and structure of the planet and how this has evolved over time. It deals with the origin of mountains, continents and oceans, the occurrence of minerals, gemstones, the use of groundwater, the interpretation of fossils and the search for new resources and new energy sources, that are crucial for the existence and prosperity of humankind. Earth Science also includes environmental geoscience, which is the study of the link between earth processes and human and ecological interactions.

What do Earth Scientists do?

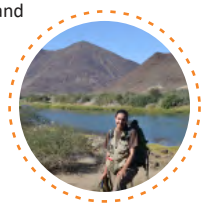
They typically work in the mining or exploration industries and combine field observations with petrology and geochemistry to understand the formation and occurrence of natural resources such as iron ore, platinum, diamonds as well as water. With a broad basis of Earth Science knowledge and skills, Earth Science graduates are typically in the front line for challenging national or international careers in the wider Earth Sciences.

Career Opportunities

With a broad basis of Earth Science knowledge and skills, you will be in the front line for a challenging national or international career in mining, exploration, applied mineralogy and environmental geochemistry.

Possible employers are:

- Council for Geoscience
- Mintek
- CSIR
- Universities
- Research Institutions
- Mining Companies
- Exploration Companies
- Geological Consultancies
- Environmental Consultancies



BSc in Earth Sciences

The Department of Earth Science offers a 3-year undergraduate programme in Earth Sciences. The programme qualifies students to undertake postgraduate studies in Earth Science (Honours, Masters and PhD) at this or other universities both in South Africa and overseas. Students can select one of two streams: (a) Applied Earth Sciences; and (b) Geo-environmental Sciences. Both streams follow the same common first year curriculum but diverge at second year, although there are still a number of modules that are common to both streams.

COMMON FIRST YEAR CURRICULUM BOTH STREAMS

124 Geo-Environmental Science
154 Geo-Environmental Science
124 Chemistry
144 Chemistry
172 Earth Science Field Skills

\+

One of the following combinations:
(a) Physics and Mathematics
(b) Physics (Bio), Mathematics (Bio), Biology
(c) Physics (Bio) and Mathematics

	APPLIED EARTH SCIENCES STREAM		GEO-ENVIRONMENTAL SCIENCE STREAM	
2nd YEAR	224 Mineralogy 214 Environmental Geochemistry 254 Optical Mineralogy and Petrography 244 Physical Earth Sciences and Structural Geology 272 Earth Science Field Skills 214 Geographical Information Systems 241 Spatial Data Management (GIT)	+ Select one of the following modules 211 Earth Observation (GIT) 242 Digital Photogrammetry (GIT) 234 Inorganic Chemistry 264 Chemical Analysis I	224 Mineralogy 214 Environmental Geochemistry 244 Physical Earth Sciences and Structural Geology 271 Environmental Field Skills 214 Geographical Information Systems	241 Geographical Information Technology 265 Environmental Studies 234 Inorganic Chemistry 264 Chemical Analysis I
3rd YEAR	314 Igneous Petrology 324 Sedimentology and Stratigraphy 344 Economic Geology 354 Metamorphic Petrology and Tectonics 374 Earth Science Field Skills 312 Spatial Analysis (GIT)	+ Select two of the following modules 364 Hydrogeology 214 Soil Science 311 Spatial Data Aquisition (GIT) 341 Spatial Modelling (GIT)	324 Sedimentology and Stratigraphy 344 Economic Geology 364 Hydrogeology 372 Environmental Field Skills 314 Environmental Geochemistry	334 Geography 358 Environmental Studies 312 Spatial Analysis (GIT) 341 Spatial Modelling (GIT)

Students wishing to practice as a geologist or other Earth Science professional should note that an Honours degree with Earth Science as a major is the MINIMUM requirement for registration as a professional geologist through SACNASP [www.sacnasp.org.za]

BSc Honours in Earth Sciences

In order to register as a professional geologist, students must undertake a 4th year of study to complete their BSc Honours in Earth Sciences. This is a one year full time programme that involves course work and an individual research project. The programme has two streams, Applied Geology and Environmental Geochemistry. The compulsory modules must be taken by all students and students must then choose one of the streams to take depending on their interest. The research project constitutes over 25% of the programme content and consists of ~14 weeks of independent research that involves a combination of field work, analytical work, experimental work and theoretical concepts.

COMPULSORY CORE MODULES BOTH STREAMS
771 Geology of Southern Africa
772 Research Methods in Earth Sciences
773 Special Topics in Earth Sciences
795 Research Project

APPLIED GEOLOGY STREAM
712 Concepts in Crustal Petrology
742 Economic Geology
▶ *Take this stream if you wish to work in the exploration or mining industries*

ENVIRONMENTAL GEOCHEMISTRY STREAM
714 Hazardous Waste Site Assessment
744 Environmental Systems
▶ *Take this stream if you wish to work in environmental, marine or groundwater sectors, or in mine rehabilitation*

Ore Deposits GEOLOGY Mineral Economics ENVIRONMENT Palaeontology Sedimentology Granites Geochemistry Stratigraphy Deposit Modelling Water Resources Mantle Dynamics Field Mapping Petrology CLIMATE CHANGE EARTH SCIENCES TECTONICS Metamorphism Marine Environments Hydrogeology