



Department of Earth and Environmental Sciences

Earth and environmental sciences deal with the interplay between the natural components of the earth and human activity. It is known that **just as the Earth's systems affect humanity, so they are also affected by human activity.** Our habitat is intrinsically linked to soil, atmosphere, rocks, and sea: the sources of water, energy and minerals, the flora that grows on the ground and the waste that is buried in it. Since the dawn of history, man has dealt with the impact of earthquakes, rock landslides, climate change, and other natural phenomena. We face these challenges with new technological tools and breaking edge developments. The department has adapted to the current climate challenges, aiming to promote deep and extensive scientific knowledge of the accelerated processes of global warming, while dealing with its consequences, recognizing that we have no other planet – **"There is no Planet B"**.

Your practical advantage

The department **trains its graduates for practical work and research** in a variety of fields of geology (dynamic, engineering, geobiology), environment, marine sciences, and hydrology.

Graduates of the department are employed in research institutions in Israel and abroad, as well as in companies and environmental organizations, leading industrial enterprises, high-tech companies, government agencies, education, and in national defense industries. Our graduates integrate in environmental protection projects, climate hazard and risk assessments, earthquake analysis and water scarcity solutions. In addition, we have graduates employed in the field of drilling supervision for geological, hydrological engineering and marine projects (including scuba diving and sailing).

Our curriculum is constantly being updated and adapted according to the expected future developments in the region, it expands and emphasizes on topics and areas where the **chances of finding employment are greater**.

Hands on Field Excursions

Geological and Environmental studies require the ability to analyze and understand rock outcrops and water columns, therefore the curriculum includes **dozens of field days on land and at sea**. The geological wonders in the Negev desert make the area one of the best natural teaching laboratories in the world and serves as a huge advantage for the students.

Innovation, Technology and Modern Resources in Research

The department is equipped with **advanced research and teaching laboratories** in the fields of geochemistry, geo - engineering, geomorphology, oceanography, paleo - magnetism, paleontology and geobiology. **The studies carried out in the Department of Earth and Environmental Sciences are at the forefront of scientific research around the world** and are carried out in collaboration with the leading universities and research institutes in the world.

Undergraduate/Bachelor Program Structure

Single-department B.Sc. degree (3 years)

In this framework, the department's main core areas are studied in several tracks:

Environment, Oceanography and Hydrology

The demand for experts in the various fields of environmental sciences, oceanography and hydrology has increased greatly in recent years. This track exposes the **graduates** of the department to the scientific knowledge and technologies applied in climate and water crisis research. Students **quantitatively** measure the changes that occur in the ocean and in marine and terrestrial water bodies. In addition, environmental problems related to wastewater management, soil pollution and landscape preservation are studied and explored.

Engineering Geology

This track lies at the interface between Earth sciences and Engineering sciences. **We are the only department in Israel that focuses on this important and highly desirable field**. The engineering geologist deals with the natural materials that build the Earth's crust, and studies their properties and mechanical behavior to predict their response to human interventions, such as tunneling, foundations, energy infrastructures, among many others. Graduates of the department are employed by private companies are integral part of planning and execution of geotechnical projects.

Dynamic Geology

Dynamic geology deals with the structure of the Earth, the composition of the materials that build it, and the internal and external processes that shape its landscapes: earthquakes, volcanic eruptions, evolution of the oceans, mountain chains and craters, and the formation of various types of minerals and rocks. There is a special emphasis on field excursions in this track, applying theoretical studies to field observations and subsurface geophysics.

Geobiology

This track focuses on understanding phenomenon and processes dictated by the interaction between the environment and life on Earth, both in the present and past. The field combines knowledge from marine sciences (oceanography), evolution, paleontology, ecology, geobiological as well as the monitoring of infections and climate change. Biology studies are provided by courses in the Department of Life Sciences.

Main department and minors

It is possible to combine studies in the Department of Earth and Environmental Sciences (without a track) with a minor in other departments and faculties, including the School of Sustainability and Climate Change. Details can be found in the department's website.

Dual -department degree (3 years)

It is possible to combine studies in the Department of Earth and Environmental Sciences (without a track) with a degree in other departments and faculties. This is done either through a condensed program with departments from the faculty of humanities and social sciences (details in the department's website) or in one of the department's special programs within the **Faculty of Natural Sciences – with the Departments of Chemistry, Physics, Computer Science, Mathematics,** and Statistics and Data Analysis.

Dual degree – Double Major (4-4.5 years)

Dual degrees are intended for outstanding students. These degrees enable the integration of full in-depth studies in the Department of **Earth and Environmental Sciences** with a full degree in **Life Sciences, Computer Science or Civil Engineering**. These are sought-after and unique programs curated by the university that have been carefully planned and coordinated between the departments.

Unique study programs in the department

Double Bachelor's degree in Civil Engineering and Earth and Environmental Sciences (4.5 years)

This is one of the university's most sought-after flagship programs designed for students with very high admission criteria (details on the website). Infrastructure engineering is a skill of high demand in Israel as the country's physical infrastructure develops, including the development of public transportation pathways, energy infrastructures, civilian infrastructures, and defense and security infrastructures. In all these areas, engineering intervention is carried out in the subsurface, from the laying of shallow gas pipes in the ground to deep tunneling in the rock. In addition, infrastructure engineering takes climate change into account and adapts to these changes while conserving the environment.

Infrastructure engineering is an interdisciplinary field, combining skills from the fields of civil

engineering, geomechanics, engineering geology, hydrology, and the environment.

Double Bachelor's degree (4 years) or dual - department (3 years) in Earth and Environmental Sciences and Computer Science

In recent years, there has been a significant increase in the quantity and quality of data in the fields of Earth and Environmental Sciences. There are constant advancements in the computation and calculation methods that allow for a significant leap forward in modeling complex processes and analyzing data. These developments have led to significant breakthroughs in understanding the processes that shape the earth, atmosphere and planets in a way that can contribute to major issues in our lives, such as climate change, earthquakes, and more. The combined degrees in Earth and Environmental Sciences and Computer Science train students with broad knowledge in both fields. The dual-departmental degree (3 years) will enable a unique combination of studies in the fields of dynamic geology, geophysics, environmental geochemistry, or oceanography with mathematics, algorithmics and computation. The dual degree - double major (4 years) will enable training and specialization in a variety of fields of each department. Graduates of the program will be able to integrate into high-tech, research and a variety of institutes that require programming capabilities and analysis of databases, especially those related to surface changes, earthquakes, and climate change.

Double Bachelor's degree (4 years) in Earth and Environmental Sciences and Life Sciences

The combination of Earth and Environmental Sciences and Life Sciences is possible through the geobiology track (3 years), dual department B.Sc. (3 years) and double B.Sc (4 years; requires high admission grades). The integration of the two disciplines focuses on feedbacks between the environment and life in the past, present, and future earth. It involves knowledge from the areas of oceanography, environmental sciences, and sustainability, and emphasizes the influence of climate change on earth habitats. The biology part of the programs is learned in the Department of Life Sciences.



Double Bachelor's degree (4 years) in Earth and Environmental Sciences and Life Sciences in the Marine Biotechnology track

This new track is part of the double degree with Life Sciences, suggesting a unique program integrating Earth Sciences, with emphasis on oceanography, environment, and sustainability, with Marine Biology and Biotechnology (Sea-Tech). Studies include 3 years in the Marcus Family campus in Be'er Sheva and a fourth year in BGU campus in Eilat and involve hands-on experience in marine science labs and research cruises and scuba-divings. The graduates of the program are well-prepared for work and research in biological and chemical oceanography, environmental biogeology and marine biotechnology.

Dual department B.Sc. (3 Years) in Earth and Environmental Sciences and Chemistry

This is a unique and new track in **environmental geochemistry**: a two-department curriculum in Chemistry and Earth and Environmental Sciences, which trains its graduates to develop applications and strategies in environmental geochemistry (in the ocean, atmosphere, soil and fresh water). The program was specifically designed to provide a thorough and in-depth basis for research and work in the field of environment and sustainability. Graduates will be able to integrate in advanced

research in both departments as well as in national environmental projects. The program has been established as part of the latest initiative of the Climate and Sustainability School in Ben-Gurion University of the Negev.

Dual department B.Sc. (3 Years) in Earth and Environmental Sciences and Physics

A unique and new track in **geophysics**: A significant part of the research of natural earth-shaping processes, in continents, oceans, and atmosphere and their mutual interaction, is based on physical principles and methods. The new curriculum combines earth and environmental sciences with the fundamentals of physics, ensuring a broad education in both fields. The program provides its graduates the opportunity to integrate into advanced studies in both departments and with the tools and knowledge required to develop new technologies. Ideally, graduates will integrate into the fields that address key topics in our lives, such as climate change, seismology and more.

Dual department B.Sc. (3 Years) in Earth and Environmental Sciences and Mathematics

Earthquakes, weather, sea-level, altitude, and the chemical composition of the water columns of oceans and lakes are measured daily in numerous sites on earth. Analysis of such big databases and understanding them requires rigorous statistical modeling, based on mathematical tools. The dual degree in Earth and Environmental Sciences and Mathematics opens gateways to highly advanced research in the world leading universities, government agencies and high-tech industries aiming at safer, greener and healthier humanity.

GeoInfo – Dual department (3 Years) B.Sc. in Earth and Environmental Sciences and B.A. in Statistics and Data Analysis

The GeoInfo program incorporates fundamental studies in Data Sciences and Machine Learning and in Earth and Environmental Sciences. The dual department degree provides powerful tools for the analysis of large climate, geophysical, and topographical databases, enabling evaluation and prediction of global changes, geo-hazards, and landscape evolution. Students graduate with B.Sc. in Earth and Environmental Sciences and B.A. in Statistics and Data Analysis.

Ashalim – Program for Outstanding Students

A program designed for academic excellence. Each outstanding student in the program will be accompanied by a personal mentor chosen from the department's lecturers. The students study in a personalized program, built in collaboration with their mentor and the chairman of the teaching committee. The students can participate in research carried out in the department. In addition, flexibility will be given in planning their study program, encouraging taking part in different fields of the university, according to the students preferences.

Dekalim - Master's Fast Track

An academic excellence program that aims to incorporate those who excel in their undergraduate degree into research towards graduate studies. Program participants will be able to complete their research and master-degree commitments within 3 semesters. Students participating will receive a special student loan that will be converted into an academic scholarship.



For more information, please contact the administration office of the Department of Earth and Environmental Sciences:

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