GEOLOGY - GEOPHYSICS

COURSE OUTLINE

Responsible: Eleni Kokkinou

1. GENERAL			
SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Department of Agriculture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	0810.7.024.0	**SEMESTER**	1st
COURSE TITLE	Geology - Geophysics		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Total	**4**	**5**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Specialisation Course / Track B
PREREQUISITE COURSES	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS	English
OFFERED TO ERASMUS STUDENTS	Yes (in English) — Winter Semester
COURSE WEBSITE (URL)	https://eclass.hmu.gr/courses/AGRO297/

2. LEARNING OUTCOMES

Learning outcomes

The course provides the fundamental knowledge required for a wide range of courses offered within the **Natural Resources Management** specialization of the Department of Agriculture. The study and analysis of geological processes responsible for shaping the Earth's surface, soil formation and subsurface structure contribute to the sustainable management of natural resources and the environment.

The course introduces students to the basic concepts of geology and geophysics in agricultural environments and familiarises them with the principal tools used in projects and studies related to these disciplines. In addition, students become acquainted with techniques for determining soil parameters useful for monitoring soil health.

Upon successful completion of the course, students will be able to:

- understand the fundamental principles of geology and geophysics;
- describe, classify and interpret landforms;
- meet the basic requirements for fieldwork;
- develop orientation skills and interpret topographic and geological maps;
- identify geological formations, with emphasis on soil-forming geological materials;
- calculate and evaluate geophysical parameters relevant to agricultural soils.

General Competences

- Search for, analyse and synthesise data and information using appropriate technologies to support effective decision-making.
- Work independently and collaboratively, preparing students to operate successfully in an international and interdisciplinary working environment and contribute to the generation of new knowledge.
- Respect the natural environment through accurate planning and optimal management of agricultural projects.
- Exercise critical thinking and self-assessment in order to promote constructive collaboration and independent scientific reasoning.

3. SYLLABUS

Introduction to Earth Structure

- Earth materials.
- Minerals and rocks.
- Igneous rocks.
- Sedimentary rocks.
- Metamorphic rocks.
- Geological time.
- Fossils.
- Paleoclimatology.
- Stratigraphy.

Terrestrial Environment

- Structure of terrestrial environments.
- Weathering and erosion.
- Soils and rocks.
- Geological mapping.

Topographic and Geological Maps

- Principles and branches of cartography.
- Map scales.
- Map projections.
- Map design and interpretation.

Field Orientation

- Horizon.
- Types of horizons.
- Visibility.
- Basic field orientation techniques.

Landforms

- Classification and characteristics of geomorphological features.
- Landscape evolution and controlling factors.

Geophysics

- Fundamental principles of geophysical methods applied to agriculture.
- Electrical, electromagnetic and magnetic methods.

Applied Geoelectromagnetics

- Electrical, dielectric and magnetic properties of rocks and minerals.
- Propagation and attenuation of electromagnetic fields.
- Direct current electrical methods (survey configurations, data processing and interpretation).
- Induced Polarisation (IP): principles, measurements, interpretation, examples and applications.

Electromagnetic Mapping

- Data acquisition.
- Processing and interpretation.
- Applications to environmental, agricultural and hydrogeological investigations.

Ground Penetrating Radar (GPR)

- Basic theory.
- Data acquisition.
- Processing and interpretation.
- Applications to environmental and soil investigations.

4. TEACHING and LEARNING METHODS - EVALUATION	
DELIVERY Face-to-face, Distance learning, etc.	The course is delivered through face-to-face lectures in the lecture hall and demonstrations of field techniques at the University Experimental Farm.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	• PowerPoint presentations and other audiovisual teaching materials. • Learning support through the HMU e-Class platform. • Communication with students via the e-Class platform and e-mail.
TEACHING METHODS The manner and methods of teaching are described in detail.	**Activity** / **Semester workload** Activity Semester Workload (hours) Lectures 52 Field Exercises 16 Coursework Preparation 13 Independent Study 44 — 125 **Course total** — **125**
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	Assessment consists of: • a final written examination; • two optional mid-term tests, the combined grade of which contributes **30%** to the final course grade. The examinations include: • essay-type questions; • multiple-choice questions; • true/false questions; • matching questions.

5. ATTACHED BIBLIOGRAPHY

- Rontogianni-Tsiabaou, T. (2018). *Geology*. Tziola Publications.
- Stournaras, G. K., & Stavropoulou, M. H. (2016). *Engineering Geology*. Tziola Publications.
- Kokkinou, E. (2015). *Environmental Geology and Geotechnology*. Hellenic Academic Libraries Link.
- Tzanis, A. (2020). *Elements of General and Applied Geophysics*. Neon Publications.