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INTERNATIONAL HELLENIC UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

www.civil.ihu.gr

STUDIES GUIDE

DEPARTMENT OF CIVIL ENGINEERING

SERRES, 2023

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I.H.U. 2023

Contents

Welcome from the Head of the Department

Dear students,

I would like to extend a warm welcome to all students of the Department of Civil Engineering. In this hanbook you will find useful information regarding the International Hellenic University, the city of Serres where the Department is located, the structure of the undergraduate studies, the curriculum, academic staff and educational facilities, graduate studies at the Department of Civil Engineering as well as career prospects for students. This hanbook was based on data from the 2022-23 academic year and is expected to be annually renewed. Together with Department's website www.civil.ihu.gr it is the main source of information regarding the academic community.

I would like to thank all staff members that contributed to the creation of this guide. I have full faith that the information included here will guide students towards the successful completion of their studies and will enhance their motivation for learning and achieving their goals. I extend my warmest wishes to all students of the Department of Civil Engineering at the International Hellenic University in the campus of Serres.

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The head of the Department

Christos Vozikis
Associate Professor

1. THE INTERNATIONAL HELLENIC UNIVERSITY

1.1 General Information

The International Hellenic University (I.H.U.) based in Thessaloniki, was founded under article 1 of Law 3391/2005 (A΄ 240). It is organized and operates as a Higher Educational Institution (HEI) in the university sector, in accordance with paragraph 1 and indent a' of paragraph 2, article 1, Law 4485/2017 (A΄114). Seven (7) Schools were established therein with corresponding Departments in each of them, under Law 4610/2019 (Government Gazette 70/A΄/7-5-2019)

Moreover, there is a University Center for International Studies in IHU based in Thessaloniki, which operates as an academic unit of the Institution.

The following Departments are established at the University Center for International Studies:

a) Humanities, Social and Economic Sciences, which is part of the School of Humanities, Social and Economic Sciences.

b) Science and Technology, which is part of the School of Science and Technology

The above Departments are located in different cities of Northern Greece. Most of them are mainly concentrated in four campuses: Thermi (where the central Administration is also located), Sindos, Serres and Kavala.

1.2 Academic and Organizational Structure

According to the current legislation, each University is subdivided into Schools, which cover a set of related scientific disciplines, so that the necessary coordination for the quality of the education provided can be ensured. A School is subdivided into individual Departments which also constitute the basic academic units. The units in question cover the subject of a specific scientific field and award the corresponding degree/diploma. The Schools of the International Hellenic University - with their Departments - are as follows:

SCHOOLS	DEPARTMENTS
SCHOOL OF ECONOMICS AND BUSINESS ADMINISTRATION (Thessaloniki)	• Department of Business Administration (Serres) • Department of Economic Sciences (Serres) • Department of Supply Chain Management (Katerini) • Department of Accounting and Finance (Kavala) • Department of Business Administration, Marketing and Tourism (Thessaloniki) • Department of Accounting and Information Systems (Thessaloniki) • Department of Management Science and Technology (Kavala)
SCHOOL OF SOCIAL SCIENCES	• Department of Library, Archive and Information Science

(Thessaloniki)	(Thessaloniki) • Department of Early Childhood Education and Care (Thessaloniki)
SCHOOL OF HEALTH SCIENCES (Thessaloniki)	• Department of Biomedical Sciences (Thessaloniki) • Department of Nutritional Sciences and Dietetics (Thessaloniki) • Department of Midwifery Science (Thessaloniki) • Department of Physiotherapy (Thessaloniki) • Department of Nursing (Thessaloniki) • Department of Nursing (Didymoteicho Branch)
SCHOOL OF ENGINEERING (Serres)	• Department of Industrial Engineering and Management (Thessaloniki) • Department of Environmental Engineering (Thessaloniki) • Department of Information Technology and Electronic Engineering (Thessaloniki) • Department of Computer, Informatics and Telecommunications Engineering (Serres) • Department of Surveying and Geoinformatics Engineering (Serres) • Department of Mechanical Engineering (Serres) • Department of Civil Engineering (Serres)
SCHOOL OF DESIGN SCIENCES (Serres)	• Department of Creative Design and Clothing (Kilkis) • Department of Interior Architecture (Serres)
SCHOOL OF SCIENCES (Kavala)	• Department of Computer Science (Kavala) • Department of Physics (Kavala) • Department of Chemistry (Kavala)
SCHOOL OF GEOSCIENCES (Drama)	• Department of Agricultural Biotechnology and Oenology (Drama) • Department of Agriculture (Thessaloniki) • Department of Forestry & Natural Environment (Drama) • Department of Food Science and Technology (Thessaloniki)
SCHOOL OF HUMANITIES SOCIAL SCIENCES AND ECONOMIC STUDIES (Thessaloniki)	• Department of Humanities Social Sciences and Economic Studies (Thessaloniki)

SCHOOL OF SCIENCE AND TECHNOLOGY (Thessaloniki)	• Department of Science and Technology (Thessaloniki)

The administrative bodies of each School are the Deanery and the Dean.

The Deanery of each School consists of:

- the Dean of the School,
- the Presidents of the Departments and
- representatives of Special Technical Laboratory Staff (E.TE.P.), Special Teaching Laboratory Staff (E.D.I.P.) and students.

The Department is managed by:

- the Department's Assembly
- the Head of the Department

The Assembly of the Department is made up of the Educational Staff members of the Department, Technical Staff representatives, undergraduate and postgraduate students.

The Assembly and the Head of the Department consist the Bodies of the Departments' (established) directions (Sectors) - where they exist. The Assembly is made up of the Educational Staff members of each course and of student representatives.

1.3 The I.H.U. Campus at Serres

The International Hellenic University Campus at Serres rests on a 200 acre area, located on the outskirts of the city of Serres. It has gradually evolved into its current form (initially from 1978-1979 as KATEE and subsequently as TEI of Central Macedonia,) with the establishment, (under Law 4610/2019 (Government Gazette 70/A'/7-5-2019) of the International Hellenic University.

The buildings and facilities at the University Campus at Serres are property of the Univesrity and were gradually built from 1990 and onwards. Today they are home to the following Departments:

- Department of Mechanical Engineering (Serres)
- Department of Surveying and Geoinformatics Engineering (Serres)
- Department of Civil Engineering (Serres)
- Department of Computer, Informatics and Telecommunications Engineering (Serres)
- Department of Interior Architecture (Serres)
- Department of Business Administration (Serres)

- Department of Economic Sciences (Serres)

Additional information regarding the Serres Campus, the Departments and their facilities can be found on the Campus's main website: https://cm.ihu.gr

Fig. 1: The I.H.U. Campus at Serres [https://cm.ihu.gr]

Below is a map of the I.H.U. Campus at Serres (Fig. 2).

Fig. 2. Building facilities at the I.H.U. Campus at Serres. [https://cm.ihu.gr]

Figure 2: Key	
A: Teaching rooms for the School of Economics and Business Administration	M: Library
B: Teaching rooms for the School of Engineering and School of Design Sciences	N: Student Dining Hall / Dormitories
Γ: Laboratories for the School of Engineering	Ξ: Substation
Δ: Laboratories for the School of Economics and Business Administration	O: Multi-use Building
E: Laboratories for the Department of Civil Engineering	Π: Café and snack bar
Z: Laboratories for the Department of Mechanical Engineering	P: Open amphitheater
K: Administration Building	Σ: Department of Computer, Informatics and Telecommunications Engineering
Λ: Main Auditorium	Σ: Department of Surveying and Geoinformatics Engineering

2. THE REGION AND THE CITY OF SERRES

2.1 Geographical and Demographic Information

The Regional Unit of Serres is one of seven regional units in the Central Macedonia Region and includes seven municipalities, with the municipality of Serres being the largest. It is situated between the regional units of Drama and Kavala (east border) , the regional units of Thessaloniki and Kilkis, (west border) and Bulgaria and North Macedonia (north border). Almost half of its area (48%) is characterized as lowland/semi-mountainous. It is surrounded by the mountain ranges of Kerkini-Vertiskos-Kerdylia to the west, the mountains of Orvilos-Menikio-Pangaio to the east and Mount Beles to the north. It is crossed by the river Strymonas and along with its main tributary, the Angitis river, constitutes an important source of natural wealth for the area. The Angitis Gorge, near the Cave of Alistrati and Lake Kerkini, a picturesque area of the European network "Natura 2000," are a small sample of the rich landscape and natural beauty of the region of Serres.

The population of Serres amounts to 73,847 residents (2021 census) and the municipality covers an area of over 600 square kilometers. The city of Serres is the seat of the municipality and the second most populous city in Macedonia. Serres is located 83 km away from Thessaloniki, 107 km from "Macedonia" Airport and 581 km from Athens. The road network connecting Serres to Thessaloniki and other cities in Northern Greece (Kavala, Drama) is in very good condition. The city is served by intercity buses (KTEL) for connections outside the regional unit to Thessaloniki, Athens, Kavala, Drama, Alexandroupolis and Bulgaria, as well as by railway (OSE), however on a less frequent schedule. Bus lines and taxis operate within the city and recently bike lanes have been developed in parts of the city.

The commercial center of Serres, which is partly pedestrianized, gathers numerous retail stores, dining and entertainment venues, banks, hotels, a cinema, museums, sports facilities and cultural centers. The city hosts the Serres Campus of the International Hellenic University and a Department of the School of Physical Education and Sports Science of the Aristotle University of Thessaloniki. Serres is regarded as a vibrant hub for students, attracting a significant number of young individuals. Residents, students and visitors can benefit from excursions to nearby destinations throughout the year. Popular destinations include Lailias Ski Center, the picturesque suburb of Agios Ioannis, Agioi Anargyroi valley, the traditional village of Ano Poroi and the pine grove at Koula which offers panoramic views of the city.

2.2 Historical Facts

The city's history can be traced back to ancient times, possibly thousands of years before the time of Herodotus (5th century B.C.). This is where the city of "Sirra" can be traced in an inscription as "City of Sirra". At the time of the Byzantine Empire the city was conquered by byzantine emperors along with other cities in Macedonia and was considered a city with strong military presence. During the Ottoman occupation the city was under Ottoman rule until 1913, with Christian and Muslim populations co-habiting throughout this period. During the Macedonia Struggle (1904-08) the people of Serres displayed significant resistance fighting against Bulgarian and Ottoman armies. After the end of the first Bulgarian rule (1912-13), a difficult and painful period for the citizens of Serres, the city was liberated on June 29th by the Greek army. During 1913-15 the area received large migrant waves and shortly after was placed under the 2nd Bulgarian rule (1916-18). The city received a second migrant wave, with its population expanding significantly and acqurining social and cultural diversity. During Word War II the city experienced the 3rd Bulgarian rule, a period distinctively harsh for its inhabitants. After the liberation, the entire area was left looted and destroyed on a significant level, with the population facing dire living conditions. In the 1960 a significant part of its population migrated abroad, looking for better living conditions. While since then the city has gradually prospered, this is a historic period laden with painful and dark memories for the surviving citizens.

Currently, the city of Serres is a vibrant, prosperous contemporary city, advancing with a steady pace and confidence in all sectors in the 21st century.

2.3 Useful Information

EMERGENCY NUMBERS		
Emergency services	**166**	
Serres Hospital	**23210-94500 / 23213-51100**	
Serres Fire Brigade	**199**	
Serres Traffic police	**23210-90809 / 23210-90872**	
Serres Police Department	**23210-90802 / 23210-90803**	
TRANSPORTATION:		
Intercity Bus Station	http://ktelserron.gr	Ticket service: 23210-22822
Railway Station	https://ose.gr	Tel.: 23210-59700
Bus Service	https://astikoktelserron.gr	Bus Terminal number: 23210-22338
Taxi Services (Ermis)	https://taxi-serres.gr	Call center: 23210-50000
CULTURAL SITES, CITY SERVISES:		
Archaeological Museum (Bezesteni)	Eleftherias Square, Serres	Tel.: 23210-22257
Natural History Museum	https://serres.gr/mouseio-fi/index.html	Tel.: 23210-99395, 52062
Central City Library	https://serrelib.gr/	Tel. 23210-98550
Municipal Theater of Serres	https://dipetheserron.gr	Tel.: 23210-54585, 54755
Municipality of Serres	http://www.serres.gr	Tel.: 23210-83600, 50100, 21111 (Citizen Help Line)
Citizen Service Centre of Serres	32 Karamanli Str., TK 62123 Serres	Tel.: 23213-50017, 50044, 50015, 50016

3. THE DEPARTMENT OF CIVIL ENGINEERING

The Department of Civil Engineering, School of Engineering, of the International Hellenic University was established in May 2019 under Law 4610 (Government Gazette 90/A΄/07-05-2019) “Synergies of Universities and T.E.I., access to higher education, experimental schools, General Archives of the State and other provisions".

Short history of the Department of Civil Engineering. The Department initially started to operate in 1983 as the Department of Civil Engineering at the Technological Educational Institute (TEI) of Serres, established by Law 1404/83 (Government Gazette A' 173/24.11.83), with two directions: (a) Civil Engineering and (b) Transportation and Hydraulic Engineering. In 1985, the Department of Civil Engineering was established (Presidential Decree 561/85, Government Gazette 19/27.11.85), incorporating the direction of "Civil Engineering," while the direction of Transportation and Hydraulic Engineering was abolished. Subsequently, in 2013, the Department of Civil Engineering and Geomatics & Geoinformatics Engineering was established within the School of Technological Applications at the TEI of Central Macedonia (Government Gazette 136/A'/5.6.2013), with two introductory directions: (a) Civil Engineering and (b) Geomatics & Geoinformatics Engineering. Finally, in 2019, the TEI of Central Macedonia was integrated into the International Hellenic University and the Department of Civil Engineering assumed its current form (Law 4610/2019).

The Department of Civil Engineering of the International Hellenic University offers a 5-year undergraduate program in the field of Civil Engineering. The purpose of the Department is to promote the science of Civil Engineering, advance higher knowledge and delve into the technology of the projects that contemporary civil engineers are called upon to study, design, and implement, maintaining principles of sustainability. The aim of the Department is to cultivate critical thinking, promote research in cutting-edge scientific fields, engage in interdisciplinary collaborations and encourage scientific excellence for its graduates. Additionally, it aims to support student and faculty mobility, contributing to inter-departmental and inter-institutional collaborations with shared objectives, both in Greece and abroad.

The Department of Civil Engineering is organized in the following Directions:

- Direction of Structural Engineering
- Direction of Geotechnical Engineering
- Direction of Transportation Engineering
- Direction of Hydraulic Engineering

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Fig 3-4. Views of buildings of the Department of Civil Engineering

4. THE UNDERGRADUATE STUDY PROGRAM

4.1 Undergraduate Study Program: Aims and Academic Subjects

The Undergraduate Program of the Department of Civil Engineering aims to provide graduates with a high academic profile that will help them engage successfully with the entire spectrum of the Civil Engineering field. Furthermore, it aims to integrate its activities in research and cutting-edge technologies with the academic activities of the Department.

The academic subjects in the Department of Civil Engineering cover the following scientific fields:

- Main Scientific Knowledge
- Building Projects and Infrastructure
- Geotechnical Engineering and Environmental Formation Works
- Hydraulic, Port and Environmental Works
- Transportation Projects and Technical Project Management.

4.2 Awarded Title and Level of Qualification

Upon completion of the five-year program of studies at the Department of Civil Engineering of the School of Engineering, students are awarded a Degree in Civil Engineering. In order to be eligible for the degree students must successfully complete all mandatory core and direction courses as well as all required elective courses. They must also successfully complete and present their dissertation, leading to a total accumulation of three hundred (300) credit units (ECTS).

Students may obtain a Degree Copy accompanied by the Diploma Supplement. The Diploma Supplement is an explanatory document that describes the nature, level, background, content and status of the studies completed by graduates. It provides information about the grading scale, the graduate's grade classification and the overall classification of the degree.

It should be noted that presently, the qualification level for the graduates of the Department, according to Article 47 of Law 4763/2020 ("National and European Qualifications Framework"), corresponds to level 6, despite the Department's 5-year study program. This is because the Department of Civil Engineering at the International Hellenic University has not yet been granted the right by the Greek State to award an Integrated Master's degree, according to Article 78 of Law 4957/2022. In the event that this will be granted, the awarded degree of the Department will correspond to level 7, according to Article 47 of Law 4763/2020 of the National and European Qualifications Framework.

4.3 Career Prospects

Graduates of the Department of Civil Engineering at the International Hellenic University acquire all required scientific and technological knowledge and skills in order to implement their expertise in all fields (technical as well as administrative) of the public and private sector. They have excellent career prospects, as they can choose within a wide range of scientific, technological, academic, administrative and educational roles from either the construction, IT or management industry, supported by the directions offered by their studies: Structural Engineering, Geotechnical Engineering, Transportation Engineering and Hydraulic Engineering.

Graduates of the Department are qualified for any of the professional activities institutionally established by the Greek State that involve project study and design, dimensional analysis, quality control, works supervision, assessment and evaluation, maintenance and management of technical installations and networks, adhering to State approved environmental processes and materials.

Finally, it should be noted that, according to Law 4763/2020, the equivalence of the Department's Curriculum with corresponding Polytechnic Schools in Greece is expected through the integration of the Department into a Polytechnic School. As a result, graduates of the Department will then be awarded full professional rights, similar to those awarded currently exclusively to graduates of Polytechnic Schools.

5. INFORMATION on the CURRICULUM

5.1 Duration of Studies

The first cycle of studies in the Department of Civil Engineering, School of Engineering of the International Hellenic University requires attending an Undergraduate Study Program (USP), which includes courses corresponding to a minimum of 300 credits (ECTS). It typically lasts five (5) academic years and culminates in the award of a Degree in Civil Engineering. In each academic year, the student chooses educational activities corresponding to 60 credits (ECTS) (Para. 2b Article 30 LAW 4009/2011)

The USP studies are conducted with the system of semester courses, which are divided into nine (9) instructional and one (1) that includes the preparation of a Diploma Dissertation.

The duration of studies in a first-cycle study program consists of a minimum of ten (10) academic semesters for the award of the degree, with the possibility of being increased by six (6) academic semesters maximum. Students may enroll in each semester of their studies, on condition that they meet the requirements fro continuation of their studies set by the law. After the completion of the maximum period of studies, the Department Assembly issues an act of deletion (article 76, par. 1, Law 4957/2022).

Students that provide proof that they are employed to work at least twenty (20) hours per week are entitled to register as part-time students. In order to register as part-time students, in accordance with the provisions of the law, they must submit a written request to be approved by the School Council.

Students who have not exceeded the maximum limit of their studies may, after applying to the Department Secretariat, interrupt their studies, for a period that does not exceed four (4) semesters. There are entitled to interrupt their studies once or partially, for a period of at least one (1) academic semester, but the duration of the interruption may not cumulatively exceed four (4) semesters, in case it is partially provided. Requests for a continuous interruption can exceptionally be considered either due to grave personal reasons, evaluated on a case-by-case basis by the Department, or due to serious health reasons of the applicant, which must be substantiated by medical documents from a Public Hospital, certifying an ongoing inability to attend classes. The application submitted to the Department's Secretariat, which is then forwarded to the School Council's Secretariat responsible for approving the application for interruption, must state the exact duration of the requested suspension. The application must be submitted at the beginning of the semester (up to fifteen days after the commencement of courses).

Student status is suspended during the interruption of studies and participation in any educational process is not allowed (article 76, par. 4, Law 4957/2022).

5.2 Admission and Registration – Renewal – Withdrawal.

Admission and registration to the Department of Civil Engineering should comply with the law. Only students that are registered in the Department of Civil Engineering of the I.H.U. after passing the National Entrance Exams for access to higher education, or after having their transfer approved or after qualifying in placement exams (in accordance with regulations) may be considered Students of Department of Civil Engineering.

The registration of newly admitted students takes place at the Department's Secretariat within time limits set every year by Ministerial Decisions.

Successful candidates of the Panhellenic Examinations (National Entrance Exams) who complete their registration through an online application, provided by the Ministry of Education and Culture, must carry out an identity check at the Secretariats of their Departments, submitting the following supporting documents:

1. Application for registration (printed from the website of the Ministry of Education),

2. Photocopy of identity card (ID),

3. One (1) photo (ID type)

For the remaining categories of new entrants the required supporting documents are announced on a case-by-case basis.

<u>Renewal of registration</u>

At the beginning of each semester, on dates that are announced on the Department's website, students are required to submit their courses registration, which at the same confirms the renewal of registration in the Department. They must state all courses of the Curriculum that they wish to attend during the specific semester. Students can enroll in the respective semesters on condition that they meet the requirements set by the law for the continuation of their studies.

<u>Withdrawal from studies</u>

Students have the right to withdraw from the Department by submitting a written request to the Department's Secretariat. The required documents for the withdrawal are the following:

a) Withdrawal request form (Statement of Responsibility), provided by the Secretariat.

b) Academic ID card, which is handed in to the Secretariat.

c) Certificate from the Library of the Campus of Serres, stating that there are no outstanding obligations to the Library.

5.3 Academic Year Calendar and Timetables

The academic year starts on the 1st of September every year and ends on the 31st of August the following year. Educational activities of every academic year are organized in two semesters: the winter semester and the spring semester. Each semester comprises of 13 weeks of teaching, one week free of courses and one examination period (three weeks of exams) for courses taught during the semester. Exact dates are determined by the Executive Committee. In general:

- Winter semester courses start in the last week of September and end in mid-January, followed by the first exam period of the winter semester.
- Spring semester courses start in late-February and end at the end of May, followed by the first exam period of the spring semester.

Every semester has two exam periods:

- Winter semester courses are examined during the exam period January-February; re-sit exams are held in September.

- Spring semester courses are examined during the exam period of June; re-sit exams are held in September.

Re-sit exams in September of each academic year have a maximum duration of four weeks. During this period, all courses taught in the previous two semesters of the specific academic year are examined. Exceptionally, under very special circumstances (natural disasters, pandemics, etc.), the Department's Assembly has the authority to modify the duration or the time limits of the semesters or examination periods, with the consent of the School's Administration and the Institution.

Every semester, before the beginning of each exam period, students are entitled to evaluate courses they attended as well as their tutors, aiming at the improvement of the quality of their studies. More information is available at the website of the Quality Assurance Unit (MODIP-I.H.U.) and the website of their Faculty/School.

HOLIDAYS

Studies at the Department of Civil Engineering have a duration of 10 semesters. Neither courses nor exams are held in the two months of summer holidays (July and August).

Holidays include:

Christmas Holidays: December 24 to January 7.

January 30: The Three Patron Saints of Education Day

Clean Monday

March 25. The Annunciation / National Anniversary of the 1821 Revolution against the Turkish Rule

Easter Holidays: from Holy Monday to Thomas Sunday

May 1st: Labor Day

Holy Spirit Day: Monday (after Pentecost).

October 28: National celebration

November 17: Students' uprising in the National Technical University of Athens against the junta in 1973

June 29th: feast day of the Patron Saint of the city of Serres

Exact dates for the commencement and ending of exam periods are common for all Faculties of the University.

5.4. Provisions for the Recognition of Previous Studies

Students admitted to the Department through placement examinations or transfer from other Departments of Civil Engineering in the country, who wish to have ECTS from courses successfully completed at their previous Department (Article 35 of Law 4115/2013) transferred to their ECTS accumulation of their current studies, must submit their requests in writing to the Department's Secretariat within a strict deadline of one (1) month from their registration date. They should simultaneously submit an excerpt from the Studies Guide of the previous Department, presenting the syllabus of the courses they were examined in, as well as a certificate of their grades. These requests are collectively examined during a session of the Department's Assembly for each academic semester. Depending on the ECTS (European Credit Transfer and Accumulation System) credits approved for transfer the number of required semesters for completing their studies is reduced accordingly, with 30 ECTS credits corresponding to each semester. For students admitted to the Department through placement examinations, credits for successful courses in the exam, along with their grades are additionally approved to be transferred. These courses should correspond to courses with identical syllabus in the undergraduate study program.

Students of the Department participating in a student exchange program (such as Erasmus+), or move under a contract or cooperation protocol signed by the I.H.U. with a foreign or domestic University hosting them to complete part of their studies, can submit an application to the Department's Secretariat upon the completion of their studies at the host University. The purpose of the application is to have ECTS of courses in which they have been successfully examined at the host institution approved for transfer to their current study program at the Department, provided that these courses are deemed equivalent (corresponding syllabus) by the tutors of the corresponding courses at the Department. Through this process students are credited with the corresponding ECTS credits, according to regulations.

The Coordinator of the corresponding international program for the Department in collaboration with the course tutor are responsible for aligning this grading with the grading scale of the International Hellenic University. They submit a proposal to the Assembly of the Department in favor of or against the approval of the requested ECTS transfer and recognition of grades. Should the request not be approved, the requested courses are listed in the student's Diploma Appendix and detailed grade report, without being included in the diploma grade calculation. The grading of courses from foreign Higher Education Institutions must be documented by official documents from the respective institutions, according to international conventions and regulations.

5.5 Registration and Enrollment in Courses

At the beginning of each academic semester students are required to register and enroll for the courses they intend to follow in the specific semester. The enrollment is carried out online through the Secretariat Online System. The exact timeframe for course enrollments is determined by the Department's Assembly and the dates are announced online by the Department's Secretariat. Failure to submit within the deadline for course enrollment excludes students from participating in the course examinations at the end of the semester. In exceptional circumstances (serious health issues, natural disasters, etc.) students are entitled to request, through an application to the Department's Assembly, an exception for approving late submission of enrollment, where the Assembly decides in favor of or against the approval of the request. Students must also choose their preferred textbook for each course through the EUDOXUS online platform (within a deadline specified by the specific service). Failure to meet this deadline does not exclude students from the course examinations but only from receiving textbooks for their courses free of charge.

Students' participation in the resit examination period of each academic year (September) does not require separate enrollment: they are entitled to be examined in all the courses they had enrolled in both semesters of the specific academic year, provided that they had either failed or had not been examined in those courses.

Course enrollment for students in the Depatrmnt of Civil Engineering is subject to the following rules:

a) The maximum limit of ECTS credits that a student can declare depends on the year of study they are in:
   - In the 1st year, they can sign up for to 30 ECTS per semester.
   - In the 2nd year, they can sign up for up to 40 ECTS per semester.
   - In the 3rd year, they can sign up for up to 40 ECTS per semester.
   - In the 4th year, they can sign up for up to 45 ECTS per semester.
   - In the 5th year and beyond, they can sign up for up to 45 ECTS per semester.

b) Students are required to prioritize enrollment in core courses that belong to previous years of study, starting from the 1st year. Only then may they enroll in courses of the current semester. If they have remaining ECTS, they can enroll in courses from the following year, provided that those courses are taught in the current academic semester.

c) Course enrollments are valid only for the semester in which they are made and for one academic year only.

Procedure of enrollment in Laboratory Classes

Certain courses may involve work in a laboratory class. In these cases, students will need to indicate their preference for enrollment in one of the available laboratory classes, following procedures described in the 'Course Outline' and in consultation with the tutor of those courses. Laboratory attendance requirements are also described in the 'Course Outline' further in this handbook (Appendix 14) as well as in the course's webpage on the e-learning platform of the department of Civil Engineering.

5.6 Academic I.D. Student Pass

Since 09/24/2012, undergraduate, postgraduate and doctoral students of all Universities in the country can apply online for the issuance of their Academic Identity Card

Ηλεκτρονική Υπηρεσία Απόκτησης Ακαδημαϊκής Ταυτότητας - Informational Portal (minedu.gov.gr)

Online Service for Acquiring Academic Identity - Information Portal (minedu.gov.gr).

5.7 Teaching Textbooks and Resources

The educational process is supported by corresponding textbooks, which are provided to students free of charge, through the online textbook management service called "EUDOXUS." Each semester, after enrolling online in their courses, students procced with the submission of their choice of textbooks for their courses through the online portal of the "EUDOXUS" system (http://eudoxus.gr/), where they indicate which textbooks they wish to receive.

In order to complete this submission, students need the access codes (username and password) provided by the Department's Secretariat, which are also used for other online services of the Institution. Students have access to a central webpage of the Central Information System (CIS), where they are authenticated. There they can find information about the approved textbooks for their Department's courses and select the ones they are entitled to (one textbook per registered course). Tutors usually suggested one or more textbooks, within which students place their choice. Subsequently, students receive an SMS and an email immediately from the CIS with their RIN code, which they can use to collect the selected textbooks either from the Campus Bookstore or from another affiliated bookstore indicated to them. Alternatively, they may follow any other procedure determined by the Ministry of Education and the EUDOXUS service (e.g., through courier services), during business days and hours, by presenting their identification card.

5.8 Curriculum

According to Article 66 of Law 4610/2019 and the Ministerial Decision (Government Gazette B' 2657/01.07.2019), the duration of the first cycle of studies in the Department is ten (10) academic semesters. In the first six semesters, all courses are common for students, while from the 7th to the 9th semester courses are specialized.

In this context, the courses of the curriculum are divided into core courses and courses that fall within the scientific areas addressed by the Department, belonging to the fields of: Structural Engineering, Geotechnical Engineering, Transportation Engineering, and Hydraulic Engineering.

The Department's curriculum, therefore, includes four (4) specialized directions, one for each of the aforementioned knowledge fields, as follows:

- Direction of Structural Engineering
- Direction of Geotechnical Engineering
- Direction of Transportation Engineering
- Direction of Hydraulic Engineering

Each direction requires the completion of 12 courses, 9 of which are mandatory for the specific direction and 3 are elective , either within the same direction or from another direction of the Curriculum. Options for elective courses within each direction are clearly defined in the Curriculum. In the 10th semester of the curriculum students are required to complete a Diploma Dissertation) on a subject related to the courses of their chosen direction.

CDL = Course Description Label
1st letter
Core (common) course
Specialization – Δ, Structural Engineering
Specialization – Γ, Geotechnical Engineering
Specialization – Σ, Transport Engineering
Specialization –Υ, Hydraulics Engineering
Core (common) course without ECTS
2nd letter
Compulsory course
Elective course

The educational process is based on face-to-face instruction, in Greek language, involving lectures, exercises, assignments, exams and more. For more information, students can refer to the “Course Outline” of each individual course (see Appendix 14).

In order to reach the stage of being awarded the Civil Engineer's 5-year Degree, students are required to successfully complete all mandatory core and direction courses, all required elective courses and successfully complete the diploma dissertation. These requirements in total lead to the accumulation of three hundred (300) credit units (ECTS).

This constitutes the first cycle of studies in the Department of Civil Engineering, according to the Curriculum, involving courses equivalent to 300 credit units. Each academic year involves educational activities corresponding to 60 credit units.

Credit units (ECTS) are a numerical value assigned to each course to describe the workload required from an individual student for the successful completion of the course. They correspond to the total hours of work (a) during the teaching of the theoretical or laboratory part (if applicable) of the course and (b) in hours of work outside the classroom (such as library work, individual study, etc.) in order to meet the requirements of the course. Each credit unit corresponds to 26 hours of work, distributed over the 16 weeks of the semester.

The workload of an academic semester is assessed at 30 credit units. Therefore, the workload per semester is 780 hours, which leads to 4,845 hours per week or 945 hours per day, assuming a five-day week.

<u>Grading:</u>

Grading is expressed as a numerical scale from zero to ten (0 - 10) where five (5) is the minimum passing mark. In all courses, the assessment of students' knowledge is expressed numerically on a scale from zero (0) to ten (10), with a minimum grading increment of one-tenth (0.1). In the grade reports, failure is indicated by grades ranging from zero (0) to four (4.9), while success is indicated by grades ranging from five (5) to ten (10).

Grades are uploaded on the online registry system, where they are accessible individually to each student. In cases where grades are listed in a table accessible to all students, only the course name, student identification number and grade are displayed, without mentioning names. Transferring of grades from one examination period to another is not permitted.

5.9 Student Performance Evaluation - Examinations

The evaluation of students' performance is completed with final examinations after the completion of each semester. These can be combined with a variety of continuous assessments (participation in intermediate exams, laboratory exercises, assignments, etc.) that the tutor is entitled to implement throughout the teaching period. Unless otherwise specified by law or Ministerial Decision, final exams are exclusively conducted after the end of the winter or spring semester, for the courses taught during those semesters. Students are entitled to take exams during the following periods: (a) January-February for courses they enrolled in at the beginning of the winter semester, (b) June for courses they enrolled in at the beginning of the spring semester, (c) September for the courses they enrolled in at the beginning of both semesters of the current academic year.

Tutors of each course organize written and/or oral examinations, selecting topics based on the course syllabus and the teaching methodology followed during the semester. In cases where a course is taught in multiple sections, the uniformity of the examination should be ensured for all sections as well as for the evaluation process.

In the event of conducting oral examinations for a course, the schedule of examinations should be announced well ahead in time. In special cases, where an individual student needs to be examined orally, a second examiner must be present during the examination as a mandatory requirement. Otherwise, the examination is considered invalid and the results are not included in the student's grading.

Examinations are conducted according to the schedule announced on the Department's website, exclusively within designated examination periods and corresponding dates determined by the Department. In exceptional cases, the Examination Program Committee, may reschedule the examination date for a specific course, in collaboration with the respective tutors. Students are entitled to have access to their exam papers, at designated hours, where they will be provided with feedback and remarks on their grading and performance.

Students who fail three consecutive times in the examination of a course are entitled to request to be examined by a committee. The Assembly appoints a committee of tutors whose subject is related to the course's syllabus. The committee chooses the topics and conducts the examination through written exams. If a student fails the committee's examination as well, he/she will participate in the regular examination process, along with the rest of the students.

Special provision is to be made for the examination of students who have diagnosis of certain health issues or learning difficulties (i.e dyslexia, serious mobility issues, visual impairments) that significantly hinder their participation in examinations. Depending on the nature of the course, the examiner may adjust the examination (conduct oral exams with the aid of a two-member committee or provide more time and explanations) in order to help the student respond as much as possible to the examination requirements.

Students are required to present their student IDs or, in case of loss, any other form of valid identification that proves their identity when attending examinations, a process that takes place prior to the start of the examinations, on arrival at the examination room.

5.10 Diploma Dissertation

Students of the Department are required to complete a Diploma Dissertation in their final (10th) semester. For this they are required to follow the instructions and templates as well as the "Regulations for the Preparation of the Diploma Dissetation" uploaded on the Department's website.

The Diploma Dissertation is supervised by a Supervisor Professor. It is presented in a public audience by the student and evaluated by a three-member Examination Committee, consisting of the Supervisor Professor and two tutors that are specialized in a related scientific field.

5.11 Work Placement (Internship)

The Undergraduate Curriculum of the Department does not currently require a mandatory Internship. In its next revision, Internship is expected to be included, most likely as an optional component.

5.12 Degree Classification – Requirements for Award of Degree

A degree in Civil Engineering, based on a 5-year program, will be awarded to students that successfully complete the first cycle of studies at the Department of Civil Engineering of the International Hellenic University. The award requires accumulating a total of three hundred (300) credits.

$$\text{Βαθμός Πτυχίου} = \frac{\sum_i \text{Βαθμός}_i \times \text{ECTS}_i}{\sum_i \text{ECTS}_i}$$

The calculation of the degree classification and the characterization of the overall students' performance are determined as the average of the grades obtained in the courses and the dissertation, with the corresponding ECTS credits serving as weight factors.

In case students accumulate more than three hundred (300) ECTS credits from additional elective or Erasmus courses, they may request that grades for specific courses not be included in the calculation of their degree classification, provided that the remaining courses and ECTS credits fully justify the awarding of the Degree in Civil Engineering and ensuring that the required 30 ECTS credits per semester are met. Any additional courses are recorded in the Transcript of Records and the Diploma Supplement, without being counted towards the calculation of the degree classification.

5.13 Graduation Certificate (Certificate of Completion of Studies) – Graduation Ceremony – Degree Copy Detailed Transcript – Diploma Supplement

Students, upon completing all academic obligations towards the 5-year Study Program, receive a Certificate of Completion of Studies, stating that they have successfully completed their studies (excluding the graduation ceremony).

Students who fulfill the requirements for the award of a degree take an oath before the Rector and the Department Chair at the graduation ceremony, according to the regulations of the Institution. For those who do not wish to take a religious oath, a simple invocation of honor and conscience is permitted. The graduation ceremony takes place within a maximum of three (3) months after the completion of the examination periods in February, June and September. The graduation ceremony is not a mandatory requirement for the successful completion of studies, but it is a necessary condition for the issuance of the Degree Copy and the parchment. Prior to the graduation ceremony, graduates may be issued a Certificate of Successful Completion of their studies.

In order to participate in the graduation ceremony, students are required to submit an application accompanied by documents that certify that there are no outstanding obligations to the institution's services (e.g., Library) and to hand in their student ID. After the graduation ceremony students may receive Degree Copy, a detailed transcript of grades and the Diploma Supplement (in Greek and English).

The Diploma Supplement aims to provide information regarding the awarded academic degrees at an international level, as well as to facilitate fair academic and professional recognition of the degree. It describes the nature, level, content, background and status of the studies successfully completed by the student whose name is stated in the original degree to which the supplement is attached.

Parchments are issued only once and include personal information stated by the student valid up until their graduation ceremony. It is signed by the Rector and the Department Chair and sealed with the official seal of the University. In order to receive the parchment, students submit an application and pay a fee at the Department's Secretariat, determined by the University's Rectorial Council.

5.14 Digital Skills Certificate

The Department of Civil Engineering provides a "Certificate of Attendance for Undergraduate Courses in the field of Informatics or Computer Operation" to students who have successfully passed at least four courses directly related to Informatics or Computer Operation. The certificate states these courses, which belong to the list of courses related to acquiring digital skills.

6. STAFF OF THE DEPARTMENT

6.1 Staff of the Department

The staff of the Department of Civil Engineering is divided into Teaching and Educational Staff (D.E.P.), Special Technical Scientific Staff (E.DI.P.), Laboratory Teaching Staff (E.TE.P.) and Administrative Staff (A.S.) with corresponding responsibilities.

The Department of Civil Engineering is staffed with 9 (D.E.P.) School members, 2 (E.DI.P.) members and 2. (E.TE.P.) members. The members of the Teaching and Educational Staff belong to four academic ranks: Professors, Associate Professors, Assistant Professors and Lecturers, while their teaching work is supported by the members of Laboratory Teaching Staff and Special Technical Scientific Staff. At the same time, the educational process of the Department is also supported by temporary educational staff, which consists of Scientific Associates, Laboratory Associates and Academic Scholars.

TABLE: EDUCATIONAL STAFF			
A/A	**FULL NAME**	**TITLE**	**SUBJECT AREA/ SPECIALTY**
1.	Dr. Panagiotis Koliopoulos	Professor	Static and dynamic analysis of structures
2.	Dr. Christos Vozikis	Associate Professor	Applied Mathematics – Statistics - Dynamics
3.	Dr. Emmanouil Kirtas	Associate Professor	Seismic response of structures and dynamic soil-foundation-structure interaction
4.	Dr. Athanasios Galanis	Assistant Professor	Planning and Design of Roads
5.	Dr. Maria N. Daniil	Assistant Professor	Architectural Design and Public Space
6.	Dr. Constantine Michailides	Assistant Professor	Marine – Hydraulic Works
7.	Dr. Stavros Papaioannou	Assistant Professor	Applied Mathematics – Statistics - Dynamics
8.	Dr. Eleni Vlachonasiou	Lecturer	Architectural Design - Constructional Architectural Drawing
9.	Georgios Panagopoulos	Lecturer	Seismic design of structures

TABLE: Special Technical Laboratory Staff (E.TE.P.) - Special Teaching Laboratory Staff (E.D.I.P.)			
A/A	**FULL NAME**	**CATEGORY**	**SUBJECT AREA/ SPECIALTY**
1.	Ilektra Ioannou	E.D.I.P	Interventions on Buildings and Open Spaces: repair, rehabilitation and urban regenerations.
2.	Ilias Pantazis	E.D.I.P	Industrial Electronic Computer Networks
3.	Konstantinos Dimitrakakis	E.TE.P.	Electronic and Informatics, with emphasis on computer systems
4.	Christina Safouri	E.TE.P.	Statistics and Business Research

TABLE: ADMINISTRATION STAFF		
A/A	**FULL NAME**	
1)	Christina Christoforidou	Head of the Secretariat
2)	Chrisoula Papageorgiou	Secretary for student affairs

Communication with the Department

Address:
Department of Civil Engineering,
Campus Serres
Terma Magnesias, Serres,
62124.

Tel: 23210 49151 (Student affairs)
49161 (Head of the Secretariat)
FAX : 23210 49154
e-mail : info@civil.ihu.gr
URL: http://civil.ihu.gr/en/pps.html

6.2 Administration/Secretariat Office: Duties and Working Hours

The Department Secretariat is responsible for student and as well as administrative affairs.

Student services are provided on all working days, during the hours of 11.00 am to 13.00 pm, at the offices of the Department Secretariat, located on the Ground floor of the Main Administration Building at the Serres Campus.

Student affairs include:

- Registration Procedures
- keeping the students' records, which include grades, registration renewals every semester and information about scholarships,
- issuing Certificates and Degrees,
- issuing certificates for legal use,
- issuing paper forms required for students' Internship,
- creating/filling in student lists, according to their course enrolment declaration
- registration cancellations of students who have two consecutive non-renewal of registration or three non-consecutive non-renewal of registration.

Regarding first-year student registrations, transfers and registration of successful candidates in placement exams in the Department of Civil Engineering of the I.H.U., the following apply:

Registration Renewals - Course Enrollments are carried out through the online Secretariat system at the beginning of each Semester, for a period of approximately fifteen (15) days. Students use their own personals code, obtained from the Department's Secretariat, in order to enroll in courses online.

After the lists of successful candidates in the National Entry Examinations are sent by the Ministry of Education and Religious Affairs, the registration deadline for new entrants is set, which is common for all higher education institutions in the country. This deadline should not be missed, otherwise latecomers lose the right to register. Registration of new entrants takes place in September.

From November 1 to 15, relevant application forms are submitted for:

- Transfers, on the ground of financial, health and social issues (children of large families) unless otherwise specified by law.

- Enrolment of Higher Education Graduates, who succeeded in placement exams, held every year at the beginning of December.

6.3 The Role of the Academic Advisor (Tutor) - Student Complaints Policy and Procedure

Each year, by decision of the Department, a member of the Teaching and Educational Staff is designated as an Academic Advisor for every first-year student, in order to provide information and guidance in their studies (i.e. the transition to tertiary education, the content of their studies, specific subjects of the Study Program, tutors, opportunities for further studies and services offered by the University to students).

The Academic Advisor informs students about his/her role and invites them to an introductory meeting. Students are encouraged to communicate regularly with their Academic Advisor, discuss educational issues and utilize the advice given throughout all the years of their studies. More information can be found in the “Regulations for the Academic Advisor”, posted on the Departement’s website.

Furthermore, the Department has approved a "Student Complaints Policy and Procedure Regulation”, aiming to resolve disputes and/or issues related to studies, enrollment, as well as behavior issues. The management of complaints and appeals is conducted with confidentiality and discretion, in accordance with the process described in the aforementioned Regulation.

6.4 Evaluation of the Educational Process from Students

After the completion of the 9th week of each semester, students are entitled to make an evaluation of the courses they attended and their tutors, in accordance with the regulations of the Institution and the guidelines of the Department of Civil Engineering. Students are encouraged to participate in this evaluation procedure. They are notified by announcements posted on the department's website to complete and submit online evaluation questionnaires for the courses they followed and tutors, belonging to any category (faculty members, teaching assistants, laboratory staff, adjunct faculty). Students' anonymity is strictly ensured and the sole purpose of the evaluation is to improve the educational standards of the Department.

Evaluations take place during the course, as determined by the tutor, within specific dates set by the Department of Internal Evaluation and before the examination period. The assessment of the evaluations is carried out by the Department's Internal Evaluation Team (OMET) in collaboration with the Internal Quality Assurance Unit of the Hellenic Quality Assurance and Accreditation Agency (HQA-AA).

7. FACILITIES

The Department of Civil Engineering at I.H.U facilities host the educational and research activities of the Department. The total area of the facilities reaches approximately 6500-7000m², including three lecture halls, five classrooms, additional training areas within the Department's laboratories, and 14 laboratory spaces with a total area of over 3000m².

The facilities consist of three (3) buildings (Buildings B, C, and E) of the University Campus in Serres. Classrooms and lecture halls are primarily located in Building B. Building C hosts one amphitheater as well as a group of laboratories of the Department (Architectural Design, Computer Rooms), while another group (Soil Mechanics, Hydraulics, Structural Materials Quality Control, Surveying, Building Construction, Reinforced Concrete) are located in Building E. A schematic representation of the Department's teaching and research facilities can be seen in Figure 5.

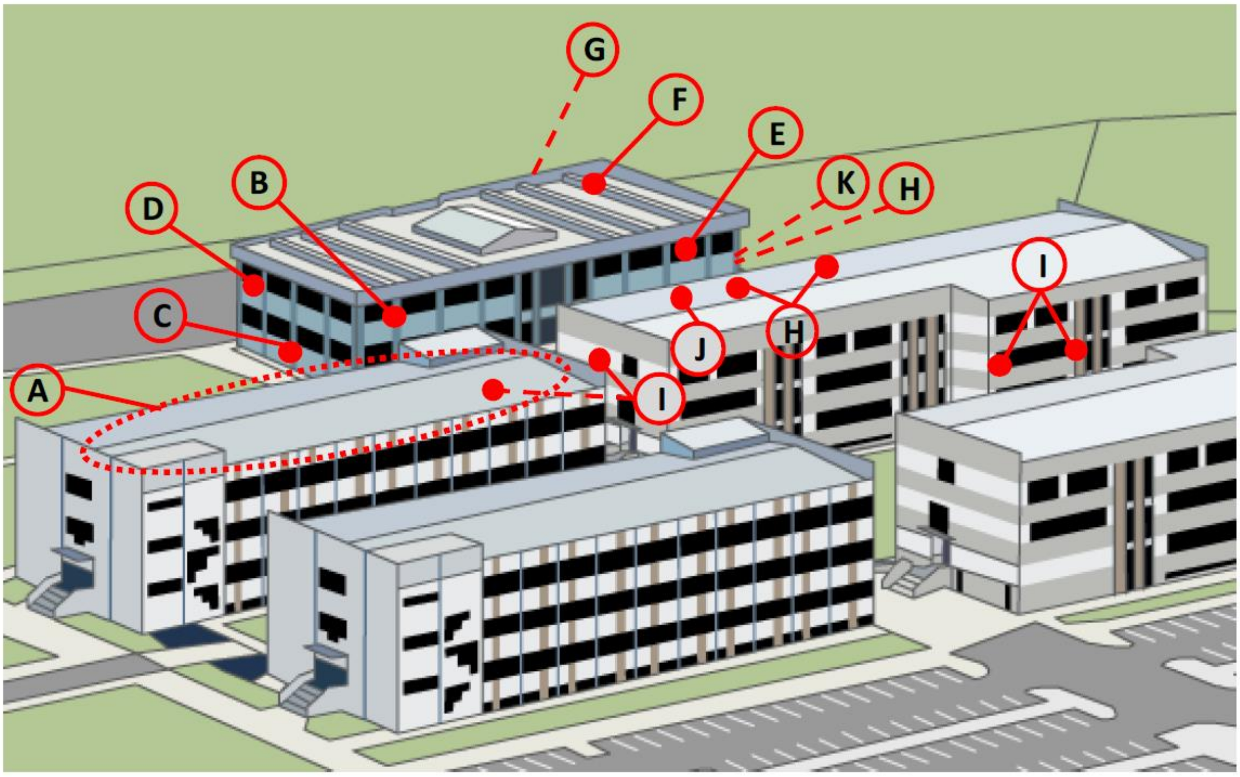

Fig 5: Teaching and research facililties of the Department of Civil Engineering at the I.H.U. Campus in Serres.

Figure 5 - Key	
A: Classrooms and lecture halls (7) B: Laboratory of Material Strength and Steel Constructions.	G: Laboratory of Surveying
C: Laboratory of Building Construction	H: Laboratories of Technical Drawing (2)
D: Laboratory of Soil Mechanics	I: Computer cluster rooms [5]
E: Laboratory of Hydraulics	J: Architectural Design Studio
F: Laboratory of Quality Control of Structural Materials	K: Laboratory of Reinforced Concrete

Classrooms and Laboratories are presented in more detail below.

7.1 Laboratory facilities and Equipment

The laboratory facilities of the Department accommodate its educational and research activities.

7.1.1 Laboratory of Reinforced Concrete

The Laboratory of Reinforced Concrete includes:

- A steel frame equipped with an advanced hydraulic jack capable of applying static and dynamic/seismic loads.
- A computer cluster for training with a capacity of over 30 students.
- Classroom space with whiteboard, accommodating approximately 40-50 students.


Fig. 6-7: The Laboratory of Reinforced Concrete

7.1.2 Laboratory of Material Strength and Steel Constructions

The Laboratory of Material Strength and Steel Constructions includes:

- A complete steel structure, integrated into the building's structure, with detailed specifications of the structural elements and joints.
- Digital rebound hammer, reinforcement detection device, ultrasonic device, torsion machine, compression machine, compression/tensile machine, photoelasticity equipment.
- A cluster of seven (7) computers with structural analysis software.
- Classroom space with 30 seats, as well as a conference space.


Fig. 8-9: Laboratory of Material Strength and Steel Constructions

7.1.3 Laboratory of Building Construction

The Laboratory of Building Construction includes

- Full-scale timber formwork,
- Components and materials for constructing different structural arrangements
- 9 work benches
- Classroom space with a capacity of more than 40 seats.


Fig. 10-11: Laboratory of Building Construction

7.1.4 Laboratory of Soil Mechanics

The Laboratory of Soil Mechanics includes:

- Advanced equipment for triaxial soil testing, direct shear testing, unconfined compressive testing, and strain gauges, connected to a data logger and computer.
- 9 work benches.
- Geotechnical laboratory equipment.
- Classroom space with 20 seats.


Fig. 12-13: Laboratory of Soil Mechanics

7.1.5 Laboratory of Hydraulics

The Laboratory of Hydraulics includes:

- Equipment for determining density, specific gravity and viscosity of liquids, hydrostatic force on a surface, local and linear losses in a conduit, hydraulic press, etc.
- Workbenches (6).


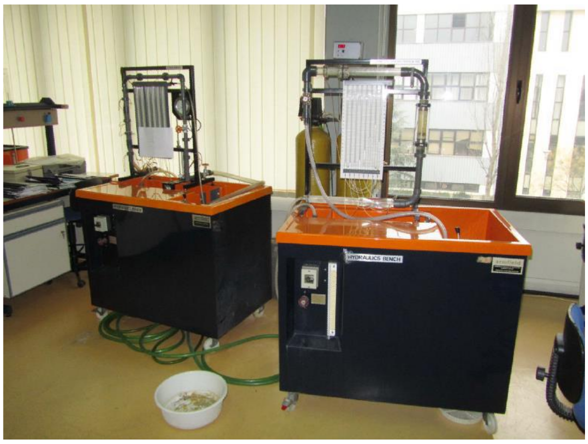

Fig. 14-15: Laboratory of Hydraulics

7.1.6 Laboratory of Quality Control of Structural Materials

The Laboratory of Quality Control of Structural Materials includes:

- Laboratory equipment for quality control of structural materials
- 7 workbenches
- Classroom space with a capacity of 25 seats.


Fig. 16-17: Laboratory of Quality Control of Structural Materials

7.1.7 Laboratory of Surveying

The Laboratory of Surveying includes:

- Complete sets of surveying equipment for student training
- Classroom space with a capacity of 40 seats

Fig. 18-19: Laboratory of Surveying

7.1.8 Technical Drawing – Drafting Rooms

Drafting Rooms for Technical Drawing (2) include:

- Inclined drawing boards
- Drawings storage space
- Ceiling mounted projectors
- Teaching capacity for 30 students (each room)

Fig. 20-21: Drafting Rooms for Technical Drawing

7.1.9 Architectural Design Studio

The Architectural design Studio includes:

- Drafting tables and desks
- Computer cluster, A3 scanner and laser printers
- Teaching capacity of 25 students.


Fig. 22-23: Architectural Design Studio

7.1.10 Computer Cluster Rooms

Computer Laboratories and clusters (Fig. 24, 25) are organized as follows:

- Two (2) CAD laboratories, each with a capacity of 20 seats.
- One (1) computer cluster for structural applications, with a capacity of 20 seats.
- One (1) computer cluster of 25 computers in the Laboratory of Reinforced Concrete.
- Additional computer cluster (with smaller student capacity) for diploma projects.

Almost all have ceiling mounted projectors.


Fig. 24, 25: Computer cluster rooms

7.2 Classrooms and Lecture Halls

The educational activities of the Department take place in 3 lecture halls (2 are exclusively used by the Department), with a capacity of 140-160 seats and 5 classrooms with capacities ranging from 50 to 90 seats. Almost all lecture halls and classrooms are equipped with ceiling mounted projectors and projection screens. Teaching spaces are also available within certain laboratories of the Department (see paragraph 7.1). Two representative classrooms of the Department are shown in Figures 26 and 27.

Fig. 26-27: Classrooms at the Department of Civil Engineering

7.3 E-Learning

The Department implements the use of a digital e-learning platform (https://elearning.cm.ihu.gr/), which has been structured to accommodate different categories of courses (e.g., undergraduate and postgraduate courses) and modules. The platform is centrally supported by the University through the IT hubs in Serres and Thermi. Through this platform, students can access course materials such as presentations, exercises, topics, data files, audiovisual materials and various other types of educational resources. They can also communicate with tutors. The system is also used for submitting assignments, conducting surveys, providing direct email notifications to students and posting announcements. The platform is available to all teaching staff (faculty members, contracted instructors, members of teaching staff) under the supervision of the Department.

7.4 Officially Established Laboratories

Currently, there are no officially established laboratories in the Department. However, they are ready to be created. At the same time, all the aforementioned laboratories and teaching rooms with technological equipment have the potential to accommodate research activities and function as research laboratories. Faculty members of the Department participate in Officially established laboratories of other Departments/Institutions and most of them engage in significant research activities, including participation in innovative research programs (see paragraph 12.1). In the coming years, under the auspices of I.H.U., the Department aims to prioritize and support both the research activities of its members and the official establishment of new laboratories.

8. The CURRICULUM

The following pages present the Curriculum of the Department of Civil Engineering at the School of Engineering, I.H.U. in a concise manner using tables (Tables I, II, and III). At the end of each table explanatory notes are given for the symbols used. A detailed presentation of the curriculum (per course) is available in the Appendix (Chapter 14).

Table I. Overview of Curriculum

Semester									
1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**
Linear Algeba and Analytical Geometry	Engineering Mechanics I	Geology for Engineers	Strength of Materials	Hydraulics	Steel Structures I	Steel Structures II	Reinforced Concrete III	Coastal and Harbor Engineering	**DIPLOMA DISSERTATION**
Differential and Integral Calculus I	Probabilities and Statistics	Theory of Elasticity	Fluid Mechanics	Urban planning, urban space & implementation of building regulations	Foundations & Retaining Walls	Matrix Structural Analysis	Coastal and Harbor Engineering	Management of Construction Sites and Construction Equipment	
Geodesy I	Differential and Integral Calculus II	Environmental Engineering	Structural Analysis I – Determinate structures	Highway Engineering I	Highway Engineering II		English-Technical terminology		
Physic for Engineers	Geodesy II	Building Construction I	Soil mechanics I	Structural Analysis II – Indeterminate structures	Dynamics of Structures I	**DIRECTION OF STRUCTURAL ENGINEERING**			
Technical Drawing	Constructional Drawing through Computer Aided Design	Differential Equations	Numerical Analysis	Reinforced Concrete II	Project Management and Construction Site Management	Plates & Shells – Special issues in Finite Element Analysis	Numerical Simulation and Analysis of Structures	Retrofitting and Strengthening of Existing Structures	
Building Materials Technology I	Computer Programming	Engineering Mechanics II	Reinforced Concrete I	Soil mechanics II	Underground Hydraulic and Hydrology	Dynamics of Structures II	Prestressed Reinforced Concrete - Special Concrete Structures	Bridge Engineering - Road Construction Works	
Basic IT tools - Writing scientific documents	Building Materials Technology II	Traffic Engineering			Water Supply and Sewerage Systems	Building Construction II	Architectural Design	Elastoplastic Analysis of Structures	
						(+one of the following 4 proposed courses)			
						A. Design and Retrofitting of Masonry Structures B. Engineering Seismology and Earthquake Engineering C. Geographic Information Systems D. Computational Methods in Fluid Mechanics	A. Elastic Stability B. Digital Tools for Design and Construction C. Special Topics in Steel Structures D. Deep Excavations and Earth Retaining Structures	A. Bioclimatic Architectural Design B. Building Documentation, Rehabilitation and Reuse. C. Composite Constructions . D.Hydraulic Structures & Dams	

DIRECTION OF GEOTECHNICAL ENGINEERING		
Engineering Seismology and Earthquake Engineering	Deep Foundations	Geotechnical Earthquake Engineering
Rock Mechanics and Tunnels	Deep Excavations and Earth Retaining Structures	Geotechnical Failures and Soil Improvement Methods
Special Topics in Geotechnical Engineering	Soil Dynamics	Computational Geotechnical Engineering
(+one of the following 4 proposed courses)		
A. Geo-environmental Engineering B. Dynamics of Structures II C. Geographic Information Systems D. Open Channel and River Hydraulics	A. Laboratory and Field Tests in Soil Mechanics B. Numerical Simulation and Analysis of Structures C. Water Resources and Flood Risk Management D. Renewable Energy Sources (geothermal, hydroelectric works)	A. Dams and Earth Structures B. Soil – Structure Interaction C. Hydraulic Structures & Dams D. Irrigation and Drainage Systems
DIRECTION OF TRANSPORT ENGINEERING		
Geographic Information Systems	Special Topics in Highway Engineering	Design and Operation of Railway Transport Systems
Transportation Planning	Road Operation and Traffic Management	Design and Operation of Sea Transport Systems
Urban Transport Systems	Road Safety	Design and Operation of Air Transport Systems
(+one of the following 4 proposed courses)		
A. Transport Economics B. Sustainable Urban Mobility C. Building Construction II D. Dynamics of Structures II	A. Environmental Impact Assessment Studies for Transport B. Laboratory and Field Tests in Soil Mechanics C. Deep Excavations and Earth Retaining Structures D. Numerical Simulation and Analysis of Structures	A. Transport policies B. Smart Cities, Infrastructure and Transport C. Bridge Engineering - Road Construction Works D. Bioclimatic Architectural Design
DIRECTION OF HYDRAULIC ENGINEERING		

Open Channel and River Hydraulics	Water Resources and Flood Risk Management	Hydraulic Structures & Dams
Urban Waste Treatment Technology	Renewable Energy Sources (geothermal, hydroelectric works)	Irrigation and Drainage Systems
Computational Methods in Fluid Mechanics	Wave Mechanics and Offshore Structures	Computational Hydrodynamics and Structures
(+one of the following 4 proposed courses)		
A. Geographic Information Systems B. Dynamics of Structures II C. Plates & Shells – Special issues in Finite Element Analysis D. Engineering Seismology and Earthquake Engineering	A. Environmental Hydraulics B. Environmental Impact Assessment Studies for Transport C. Deep Excavations and Earth Retaining Structures D. Numerical Simulation and Analysis of Structures	A. Marine renewable energy systems B. Bioclimatic Architectural Design C. Bridge Engineering - Road Construction Works) Δ. Building Construction II

Mandatory courses	Elective courses	Total of required courses
46	**12**	**60**

Skills development courses
Scientific field courses
Direction courses
General Backgound courses
General Knowledge courses

Table II. Directions: Elective courses

Semester	DIRECTION OF STRUCTURAL ENGINEERING	DIRECTION OF GEOTECHNICAL ENGINEERING	DIRECTION OF TRANSPORT ENGINEERING	DIRECTION OF HYDRAULIC ENGINEERING	Modes of choice
7	Plates & Shells – Special issues in Finite Element Analysis	Engineering Seismology and Earthquake Engineering	Geographic Information Systems	Open Channel and River Hydraulics	Mandatory elective for the Direction
7	Dynamics of Structures II	Rock Mechanics and Tunnels	Transportation Planning	Urban Waste Treatment Technology	Mandatory elective for the Direction
7	Building Construction II	Special Topics in Geotechnical Engineering	Urban Transport Systems	Computational Methods in Fluid Mechanics	Mandatory elective for the Direction
7	A. Design and Retrofitting of Masonry Structures B. Engineering Seismology and Earthquake Engineering C. Geographic Information Systems D. Computational Methods in Fluid Mechanics	A. Geo-environmental Engineering B. Dynamics of Structures II C. Geographic Information Systems D. Open Channel and River Hydraulics	A. Transport Economics B. Sustainable Urban Mobility C. Building Construction II D. Dynamics of Structures II	A. Geographic Information Systems B. Dynamics of Structures II C. Plates & Shells – Special issues in Finite Element Analysis D. Engineering Seismology and Earthquake Engineering	**1 of 4**
8	Numerical Simulation and Analysis of Structures	Deep Foundations	Special Topics in Highway Engineering	Water Resources and Flood Risk Management	Mandatory elective for the Direction
8	Prestressed Reinforced Concrete - Special Concrete Structures	Deep Excavations and Earth Retaining Structures	Road Operation and Traffic Management	Renewable Energy Sources (geothermal, hydroelectric works)	Mandatory elective for the Direction
8	Architectural Design	Soil Dynamics	Road Safety	Wave Mechanics and Offshore Structures	Mandatory elective for the Direction
8	A. Elastic Stability B. Digital Tools for Design and Construction C. Special Topics in Steel Structures D. Deep Excavations and Earth Retaining Structures	A. Laboratory and Field Tests in Soil Mechanics B. Numerical Simulation and Analysis of Structures C. Water Resources and Flood Risk Management D. Renewable Energy Sources (geothermal, hydroelectric works)	A. Environmental Impact Assessment Studies for Transport B. Laboratory and Field Tests in Soil Mechanics C. Deep Excavations and Earth Retaining Structures D. Numerical Simulation and Analysis of Structures	A. Environmental Hydraulics B. Environmental Impact Assessment Studies for Transport C. Deep Excavations and Earth Retaining Structures D. Numerical Simulation and Analysis of Structures	**1 of 4**
9	Retrofitting and Strengthening of Existing Structures	Geotechnical Earthquake Engineering	Design and Operation of Railway Transport Systems	Hydraulic Structures & Dams	Mandatory elective for the Direction

9	Bridge Engineering - Road Construction Works	Geotechnical Failures and Soil Improvement Methods	Design and Operation of Sea Transport Systems	Irrigation and Drainage Systems	Mandatory elective for the Direction
9	Elastoplastic Analysis of Structures	Computational Geotechnical Engineering	Design and Operation of Air Transport Systems	Computational Hydrodynamics and Structures	Mandatory elective for the Direction
9	A. Bioclimatic Architectural Design B. Building Documentation, Rehabilitation and Reuse. C. Composite Constructions D.Hydraulic Structures & Dams	A. Dams and Earth Structures B. Soil – Structure Interaction C. Hydraulic Structures & Dams D. Irrigation and Drainage Systems	A. Transport policies B. Smart Cities, Infrastructure and Transport C. Bridge Engineering - Road Construction Works D. Bioclimatic Architectural Design	A. Marine renewable energy systems B. Bioclimatic Architectural Design C. Bridge Engineering - Road Construction Works) Δ. Building Construction II	**1 of 4**

Table III. Curriculum

1st Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	KY	ΓΕΝ002	Linear Algebra and Analytical Geometry	3	5
2	KY	ΓΕΝ001	Differential and Integral Calculus I	4	5
3	KY	ΣΥΓ001	Geodesy I	4	5
4	KY	ΓΕΝ003	Physics for Engineers	5	6
5	KY	ΔΟΜ001	Technical Drawing	4	5
6	KY	ΔΟΜ002	Building Materials Technology I	4	4
7	XY	ΓΕΝ009	Basic IT tools - Writing scientific documents	1	0
			Total	**25**	**30**

2nd Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	KY	ΔΟΜ004	Engineering Mechanics I	4	5
2	KY	ΓΕΝ005	Probabilities and Statistics	3	4
3	KY	ΓΕΝ004	Differential and Integral Calculus II	4	5
4	KY	ΣΥΓ002	Geodesy II	5	5
5	KY	ΔΟΜ003	Constructional Drawing through Computer Aided Design	4	4
6	KY	ΓΕΝ006	Computer Programming	3	3
7	KY	ΔΟΜ005	Building Materials Technology II	4	4
			Total	**27**	**30**

3rd Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	KY	ΓΕΩ001	Geology for Engineers	4	4
2	KY	ΔΟΜ006	Theory of Elasticity	4	5
3	KY	ΥΔΡ001	Environmental Engineering	4	3
4	KY	ΔΟΜ007	Building Construction I	4	4
5	KY	ΓΕΝ007	Differential Equations	4	5
6	KY	ΔΟΜ008	Engineering Mechanics II	4	5
7	KY	ΣΥΓ003	Traffic Engineering	4	4
			Total	**28**	**30**

4th Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	KY	ΔΟΜ009	Strength of Materials	4	5
2	KY	ΥΔΡ002	Fluid Mechanics	4	5
3	KY	ΔΟΜ012	Structural Analysis I – Determinate structures	4	5

4	ΚΥ	ΓΕΩ002	Soil mechanics I	4	5
5	ΚΥ	ΓΕΝ008	Numerical Analysis	4	5
6	ΚΥ	ΔΟΜ010	Reinforced Concrete I	4	5
			Total	**24**	**30**

5th Semester

#	CDL	Code	Course Title	Hours/week	ECTS
1	ΚΥ	ΥΔΡ003	Hydraulics	4	5
2	ΚΥ	ΔΟΜ011	Urban planning, urban space & implementation of building regulations	4	5
3	ΚΥ	ΣΥΓ004	Highway Engineering I	4	5
4	ΚΥ	ΔΟΜ014	Structural Analysis II – Indeterminate structures	4	5
5	ΚΥ	ΔΟΜ013	Reinforced Concrete II	4	5
6	ΚΥ	ΓΕΩ003	Soil mechanics II	4	5
			Total	**24**	**30**

6th Semester

#	CDL	Code	Course Title	Hours/week	ECTS
1	ΚΥ	ΔΟΜ016	Steel Structures I	4	4
2	ΚΥ	ΓΕΩ004	Foundations & Retaining Walls	4	5
3	ΚΥ	ΣΥΓ005	Highway Engineering II	4	4
4	ΚΥ	ΔΟΜ015	Dynamics of Structure I	4	5
3	ΚΥ	ΣΥΓ006	Project Management and Construction Site Management	4	4
6	ΚΥ	ΥΔΡ005	Underground Hydraulic and Hydrology	4	4
7	ΚΥ	ΥΔΡ004	Water Supply and Sewerage Systems	4	4
			Total	**28**	**30**

7th Semester

#	CDL	Code	Course Title	Hours/week	ECTS
1	ΚΥ	ΔΟΜ017	Steel Structures II	4	5
2	ΚΥ	ΔΟΜ018	Matrix Structural Analysis	4	5
			Direction of Structural Engineering – Δ		
3	ΔΥ	ΔΟΜ020	Plates & Shells – Special issues in Finite Element Analysis	4	5
4	ΔΥ	ΔΟΜ021	Dynamics of Structures II	4	5
5	ΔΥ	ΔΟΜ022	Building Construction II	4	5
6α	ΔΕ	ΔΟΜ019	Design and Retrofitting of Masonry Structures	4	5
6β	ΔΕ	ΓΕΩ005	Engineering Seismology and Earthquake Engineering (ΓΥ)	4	5
6γ	ΔΕ	ΣΥΓ007	Geographic Information Systems (ΣΥ)	4	5
6δ	ΔΕ	ΥΔΡ008	Computational Methods in Fluid	4	5

			Mechanics		
			Direction of Geotechnical Engineering – Γ		
3	ΓΥ	ΓΕΩ005	Engineering Seismology and Earthquake Engineering	4	5
4	ΓΥ	ΓΕΩ006	Rock Mechanics and Tunnels	4	5
5	ΓΥ	ΓΕΩ007	Special Topics in Geotechnical Engineering	4	5
6α	ΓΕ	ΓΕΩ008	Geo-environmental Engineering	4	5
6β	ΓΕ	ΔΟΜ021	Dynamics of Structures II (ΔΥ)	4	5
6γ	ΓΕ	ΣΥΓ007	Geographic Information Systems (ΣΥ)	4	5
6δ	ΓΕ	ΥΔΡ006	Open Channel and River Hydraulics (ΥΥ)	4	5
			Direction of Transport Engineering – Σ		
3	ΣΥ	ΣΥΓ007	Geographic Information Systems	4	5
4	ΣΥ	ΣΥΓ008	Transportation Planning	4	5
5	ΣΥ	ΣΥΓ009	Urban Transport Systems	4	5
6α	ΣΕ	ΣΥΓ010	Transport Economics	4	5
6β	ΣΕ	ΣΥΓ011	Sustainable Urban Mobility	4	5
6γ	ΣΕ	ΔΟΜ022	Building Construction II (ΔΥ)	4	5
6δ	ΣΕ	ΔΟΜ021	Dynamics of Structures II (ΔΥ)	4	5
			Direction of Hydraulic Engineering –Υ		
3	ΥΥ	ΥΔΡ006	Open Channel and River Hydraulics	4	5
4	ΥΥ	ΥΔΡ007	Urban Waste Treatment Technology	4	5
5	ΥΥ	ΥΔΡ008	Computational Methods in Fluid Mechanics	4	5
6α	ΥΕ	ΣΥΓ007	Geographic Information Systems (ΣΥ)	4	5
6β	ΥΕ	ΔΟΜ021	Dynamics of Structures II (ΔΥ)	4	5
6γ	ΥΕ	ΔΟΜ020	Plates & Shells – Special issues in Finite Element Analysis (ΔΥ)	4	5
6δ	ΥΕ	ΓΕΩ005	Engineering Seismology and Earthquake Engine (ΓΥ)	4	5
			Total	**24**	**30**

8th Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	ΚΥ	ΔΟΜ024	Reinforced Concrete III	4	5
2	ΚΥ	ΔΟΜ023	Earthquake Engineering	4	5
3	ΧΥ	ΓΕΝ010	English-Technical terminology	2	0
			Direction of Structural Engineering – Δ		
4	ΔΥ	ΔΟΜ025	Numerical Simulation and Analysis of Structures	4	5
5	ΔΥ	ΔΟΜ026	Prestressed Reinforced Concrete - Special Concrete Structures	4	5

6	ΔΥ	ΔΟΜ027	Architectural Design	4	5
7α	ΔΕ	ΔΟΜ028	Elastic Stability	4	5
7β	ΔΕ	ΔΟΜ029	Digital Tools for Design and Construction	4	5
7γ	ΔΕ	ΔΟΜ030	Special Topics in Steel Structures	4	5
7δ	ΔΕ	ΓΕΩ010	Deep Excavations and Earth Retaining Structures (ΓΥ)	4	5
			Direction of Geotechnical Engineering – Γ		
4	ΓΥ	ΓΕΩ009	Deep Foundations	4	5
5	ΓΥ	ΓΕΩ010	Deep Excavations and Earth Retaining Structures	4	5
6	ΓΥ	ΓΕΩ011	Soil Dynamics	4	5
7α	ΓΕ	ΓΕΩ012	Laboratory and Field Tests in Soil Mechanics	4	5
7β	ΓΕ	ΔΟΜ025	Numerical Simulation and Analysis of Structures (ΔΥ)	4	5
7γ	ΓΕ	ΥΔΡ009	Water Resources and Flood Risk Management (ΥΥ)	4	5
7δ	ΓΕ	ΥΔΡ010	Renewable Energy Sources (geothermal, hydroelectric works) (ΥΥ)	4	5
			Direction of Transport Engineering – Σ		
4	ΣΥ	ΣΥΓ012	Special Topics in Highway Engineering	4	5
5	ΣΥ	ΣΥΓ013	Road Operation and Traffic Management	4	5
6	ΣΥ	ΣΥΓ014	Road Safety	4	5
7α	ΣΕ	ΣΥΓ015	Environmental Impact Assessment Studies for Transport	4	5
7β	ΣΕ	ΓΕΩ012	Laboratory and Field Tests in Soil Mechanics (ΓΕ)	4	5
7γ	ΣΕ	ΓΕΩ010	Deep Excavations and Earth Retaining Structures (ΓΥ)	4	5
7δ	ΣΕ	ΔΟΜ025	Numerical Simulation and Analysis of Structures (ΔΥ)	4	5
			Direction of Hydraulic Engineering –Υ		
4	ΥΥ	ΥΔΡ009	Water Resources and Flood Risk Management	4	5
5	ΥΥ	ΥΔΡ010	Renewable Energy Sources (geothermal, hydroelectric works)	4	5
6	ΥΥ	ΥΔΡ011	Wave Mechanics and Offshore Structures	4	5
7α	ΥΕ	ΥΔΡ012	Environmental Hydraulics	4	5
7β	ΥΕ	ΣΥΓ015	Environmental Impact of Transport Infrastructure (ΣΕ)	4	5
7γ	ΥΕ	ΓΕΩ010	Deep Excavations and Earth Retaining Structures (ΓΥ)	4	5
7δ	ΥΕ	ΔΟΜ025	Numerical Simulation and Analysis of Structures (ΔΥ)	4	5

			Total	**26**	**30**

9th Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	ΚΥ	ΥΔΡ013	Coastal and Harbor Engineering	4	5
2	ΚΥ	ΣΥΓ017	Management of Construction Sites and Construction Equipment	4	5
			Direction of Structural Engineering – Δ		
3	ΔΥ	ΔΟΜ031	Retrofitting and Strengthening of Existing Structures	4	5
4	ΔΥ	ΔΟΜ032	Bridge Engineering - Road Construction Works	4	5
5	ΔΥ	ΔΟΜ033	Elastoplastic Analysis of Structures	4	5
6α	ΔΕ	ΔΟΜ034	Bioclimatic Architectural Design	4	5
6β	ΔΕ	ΔΟΜ035	Building Documentation, Rehabilitation and Reuse.	4	5
6γ	ΔΕ	ΔΟΜ036	Composite Constructions	4	5
6δ	ΔΕ	ΥΔΡ014	Hydraulic Structures & Dams (ΥΥ)	4	5
			Direction of Geotechnical Engineering – Γ		
3	ΓΥ	ΓΕΩ013	Geotechnical Earthquake Engineering	4	5
4	ΓΥ	ΓΕΩ014	Geotechnical Failures and Soil Improvement Methods	4	5
5	ΓΥ	ΓΕΩ015	Computational Geotechnical Engineering	4	5
6α	ΓΕ	ΓΕΩ016	Dams and Earth Structures	4	5
6β	ΓΕ	ΓΕΩ017	Soil – Structure Interaction	4	5
6γ	ΓΕ	ΥΔΡ014	Hydraulic Structures & Dams (ΥΥ)	4	5
6δ	ΓΕ	ΥΔΡ015	Irrigation and Drainage Systems (ΥΥ)	4	5
			Direction of Transport Engineering – Σ		
3	ΣΥ	ΣΥΓ016	Design and Operation of Railway Transport Systems	4	5
4	ΣΥ	ΣΥΓ018	Design and Operation of Sea Transport Systems	4	5
5	ΣΥ	ΣΥΓ019	Design and Operation of Air Transport Systems	4	5
6α	ΣΕ	ΣΥΓ020	Transport policy	4	5
6β	ΣΕ	ΣΥΓ021	Smart Cities, Infrastructure and Transport	4	5
6γ	ΣΕ	ΔΟΜ032	Bridge Engineering - Road technical works (ΔΥ)	4	5
6δ	ΣΕ	ΔΟΜ034	Bioclimatic Architectural Design (ΔΕ)	4	5
			Direction of Hydraulic Engineering –Υ		

3	ΥΥ	ΥΔΡ014	Hydraulic Structures & Dams	4	5
4	ΥΥ	ΥΔΡ015	Irrigation and Drainage Systems	4	5
5	ΥΥ	ΥΔΡ016	Computational Hydrodynamics and Structures	4	5
6α	ΥΕ	ΥΔΡ017	Marine renewable energy systems	4	5
6β	ΥΕ	ΔΟΜ034	Bioclimatic Architectural Design (ΔΕ)	4	5
6γ	ΥΕ	ΔΟΜ032	Bridge Engineering - Road Construction Works (ΔΥ)	4	5
6δ	ΥΕ	ΔΟΜ022	Building Construction II (ΔΥ 7ο)	4	5
			Total	**24**	**30**

10th Semester					
#	**CDL**	**Code**	**Course Title**	**Hours/week**	**ECTS**
1	ΠΥ	ΔΙΠ001	Diploma Dissertation		30
			Total		**30**

9. POSTGRADUATE STUDY PROGRAMS IN THE DEPARTMENT

The Department of Civil Engineering at the School of Engineering, I.H.U. offers a Master's Program titled **"Interventions on Buildings and Open Spaces: retrofit, rehabilitation and urban regenerations."** This program completes its cycle of activities during the academic year 2022-23. It has been operating successfully since the academic year 2017-18, with a significant number of graduates. For more information, please refer to the website of the Master's Program "Interventions on Buildings and Open Spaces: retrofit, rehabilitation and urban regenerations" at http://civil.ihu.gr/pms/

The adverse circumstances of the COVID-19 pandemic, which coincided with the re-establishment of the Department within the new structure I.H.U., did not favor the organizational continuity of this Master's program.

The Department of Civil Engineering at the School of Engineering, I.H.U. is close to establishing a new Master's Program very soon and welcome new postgraduate students, responding to the interests of candidates by focusing on cutting-edge subjects within the field of Civil Engineering.

10. DOCTORAL STUDIES in the DEPARTMENT

10. 1 General information

The Doctoral Studies at the Department of Civil Engineering at the International University of Greece aim to advance scientific knowledge through the production of innovative scientific research, leading to the acquisition of a Doctoral Degree (PhD). The Doctoral Degree represents the highest academic title which certifies the mastery of research methodology and the substantial contribution of the holder to the advancement of science and knowledge to his/her respective discipline.

The Doctoral Program at the Department of Civil Engineering at DI.PA.E. is organized and operates in accordance with the provisions of Law 4957/2022 (Government Gazette A' 141) and all relevant legislative decisions in force.

10.2 Administration - Supervision

The governing bodies of the Doctoral Program, according to current legislation, are the Department Assembly and the I.H.U. Senate. Until the establishment of the Senate of I.H.U. the respective responsibilities are transferred to the Governing Committee of the Institution. In order to ensure the smooth functioning and monitoring of the Doctoral Studies, the Department Assembly may establish a Doctoral Studies Coordinating Committee (DSCC).

The I.H.U. Senate. is the main body for academic, administrative, organizational and financial affairs and exercises any powers not specifically assigned by law to other bodies.

Concerning the organization of the Doctoral Studies, the Assembly of the Department has the following responsibilities:

a. Appointment of the Doctoral Studies Coordinating Committee (DSCC).

b. Announcement of the opening of application from prospective doctoral candidates.

c. Definition of the scientific fields available for applications from prospective doctoral candidates and the appointment of Evaluation Committees, consisting of faculty members of the Department, categorized by discipline and academic subject areas.

d. Evaluation of applications from prospective doctoral candidates.

e. Appointment, in accordance with current Regulations, of the members of the three-member Advisory Committees, the members of the seven-member Examination Committees and the members of the Evaluation Committees for candidates.

f. Reception of the annual progress reports of doctoral candidates.

g. Awarding of the Doctoral Diplomas.

h. The Assembly exercises any other authority provided by the provisions of the law and the present Regulations.

The DSCC is responsible for coordinating the operation of the Doctoral Studies. Its role is advisory and its work can be specified by decisions of the Department Assembly. It consists of the Vice-Chairperson of the Department, serving as Director and two faculty members of the

Department appointed by the Department Assembly. The term of office for DSCC members is two years, with the possibility of renewal.

10.3 Eligibility Criteria

Eligible candidates for a Doctoral Dissertation in the Department of Civil Engineering of the DI.PA.E. are:

A. Holders of a degree from a Greek or foreign Higher Education Institution (University or Technological Educational Institute) and a Master's degree from a Greek or foreign Higher Education Institution. The degrees from foreign Institutions are recognized only if the Institutions and the degrees are included in the National Register of Recognized Higher Education Institutions and the National Register of Degree Types of Recognized Institutions abroad, respectively (Article 304 of Law 4957/2022). Additionally, if the degree is included in the list of foreign Institutions with a user agreement (Article 307, Law 4957/2022), a Certificate of Place of Studies is required, which is issued and sent by the foreign university. In this case, recognition of academic degrees is possible on the condition that the entire course of study was completed outside Greek territory, unless the studies conducted in Greek territory were carried out at a public Higher Education Institution (University or Technological Educational Institute).

B. Holders of an Integrated Master's degree, according to Article 78 of Law 4957/2022 (Government Gazette A' 141). The suitability of the academic degrees and the adequacy of the candidate's knowledge are thoroughly examined by the three-member Evaluation Committee and approved solely by the Department Assembly.

10.4 Duration of Doctoral Studies

The minimum duration for obtaining the Doctoral Degree is at least three (3) full calendar years from the date of appointment of the three-memebr Advisory Committee. The maximum completion time for the thesis is set at six (6) years. The period may be extended for significant reasons (i.e. health reasons, fulfillment of military obligations) by annual extensions for two (2) additional years, upon request of the candidate, with the concurring opinion of the three-member Advisory Committee. The approval of the extension is issued by a substantiated decision of the Department Assembly.

Doctoral candidates may apply for suspension of studies for one (1) full calendar year after stating their reasons for the syspension request. This application is either approved or rejected by the Department Assembly. During the suspension of studies, both the status of doctoral candidates and all privileges attached are suspended. The time of suspension is not taken into account for the calculation of the maximum total time of completion of the Doctoral Thesis. Candidates have the right to interrupt the suspension of their studies at any time. For each doctoral candidate, the number of applications for the suspension of studies should not exceed two (2) throughout the entire duration of their Doctoral Thesis.

More information about the selection process of doctoral candidates, students' obligations and priviledges, developlment and support of the thesis as well as other provisions can be found in the Doctoral Studies Regulation of the Department of Civil Engineering, I.H.U. which is available on the Department's website [in Greek] http://civil.ihu.gr/regulations/PhD.pdf

11. SERVICES AND STUDENT WELFARE OFFICE

Students of the Department of Civil Engineering have access to a range of services as members of the academic community at the International Hellenic University Serres Campus. These services aim to facilitate their studies, support their successful completion in time and enhance their interest in learning throughout their student life.

11.1 European Programs Office (Erasmus+)

Erasmus+ is the new program of the European Commission for education, training, youth and sports. It aims to enhance skills and employability, as well as to modernize education, training, and youth systems in all fields of Lifelong Learning (Higher Education, Vocational Education and Training, Adult Education, School Education, youth activities, etc.). The Department of Public and International Relations is responsible for the administrative support and implementation of the Erasmus+ programs related to student and staff mobility. All information necessary for students' participation in these programs is provided through its website (http://erasmusplus.teicm.gr). In the Department of Civil Engineering, a faculty member has been appointed as the coordinator for Erasmus+ studies and mobility, guiding students on their choices, opportunities and obligations when participating in the Erasmus+ programs.

11.2 Library

The Library of the Campus of Serres (http://lib.teicm.gr) offers a large collection of scientific books and journals, accessible to all members of the academic community. It provides access to a wide range of digital services, including online sources such as articles, conference proceedings, scientific data and more. The library features reading rooms and spaces for studying and searching for textbooks while all services are supported by highly trained and specialized staff. The Library also organizes seminars open to the academic community in order to promote the benefits from use of its services and digital tools.

11.3 Student Restaurant - Dining Hall

The Student Restaurant in the Serres Campus of I.H.U. provides dining facilities for all members of the academic community throughout the academic year. There is also provision for free meals for students who meet the financial criteria set by legislation. All relevant information can be obtained from the Office of the Student Restaurant, located on the ground floor of the Library building.

11.4 Student Dormitory

Students are responsible for finding their own accommodation in Serres. Due to the lack of a Dormitory for undergraduate students, the University provides eligible students with a housing allowance, under the conditions set by relevant legislation and the University. The State grants an annual housing subsidy of €1,000 to eligible students, under the conditions mentioned in Law 3220/2004. This certificate is provided by the Department's Secretariat.

Regarding incoming students participating in the ERASMUS+ program in particular, there is a small dormitory available at the University Campus I. H.U. Serres. The Department of Public and International Relations and Programs of Serres, located in the Administration Building (1st floor) of the I.H.U. Serres Campus, is in charge of the management and operation of these specific facilities, which are also available to visiting international research academic staff. The Department is a subunit of the Student Welfare Directorate of I.H.U., see Student Welfare Directorate - International Hellenic University [https://www.ihu.gr/foititiki-merimna].

11.5 Student Health Care Service

A Department of Health Care, Counseling and Psychological Support is operating at the I.H.U. Campus in Serres. The Department is located in the Administration Building (1st floor) and caters to all students and staff of the university campus, providing services and operationg as a First Aid Station. The Department is a subunit of Student Welfare Directorate of I.H.U., see Student Welfare Directorate - International Hellenic University [https://www.ihu.gr/foititiki-merimna].

11.6 Universtiy Gym

The I.H.U. Campus in Serres provides an indoor gym for all members of the academic community, fully equipped with training instruments for physical exercise.

11.7 Sports and Cultural Activities

The Department of Public - International Relations and Programs in Serres, located in the Serres University Campus, in the Administration building (1st floor), is responsible for organizing cultural events and implementing initiatives of the Academic community of I.H.U. at Serres. It is a subunit of the Student Welfare Directorate of I.H.U., [https://www.ihu.gr/foititiki-merimna].The outdoor amphitheater in the Serres University Campus has hosted numerous theatrical and musical performances, throughout the campus operation in previous years.

11.8 Network Operations Center (NOC)– Online Services

Network Operation and Management Center: The Network Operation and Management Center is responsible for managing and ensuring the smooth operation of all digital procedures established for the administrative and educational operation of the Department of Civil Engineering. This includes tasks such as online administration, email services and user accounts, among others.

Secretariat Online System: Through access to the Secretariat Online System, students of the Department have the ability to manage their course registrations, enrollments, monitor their grades and generate detailed transcripts. Similarly, tutors have the ability to manage the list of enrolled students in their courses and post their grades.

Email Service: Students have the ability to create their personal institutional account and e-mail address, for communication among members of the academic community for all educational activities.

E-learning Platform: The educational 'e-learning' platform is a vital educational tool, complementary with 'face-to-face' teaching, which is the main mode of teaching for the Curriculum of the Department of Civil Engineering. Notes, exercises and a wide variety of educational material can be uploaded on the e-learning platform, as well as educational tools which can contribute to the educational process and enhance students' learning.

12. INTERNATIONAL DIMENSION of the CURRICULUM – PARTNERSHIPS – SCIENTIFIC EVENTS

12.1 Participation of Members of the Department in Applied Research

Members of the Department of Civil Engineering at I.H.U. actively participate in research, establishing collaborations with their counterparts at a national and international level. Below are some examples of these collaborations (5-year data):

- **EReS: Earthquake Resilient Schools**, recent grant approval of a european research program Union Civil Protection Mechanism (UCPM) (UCPM-2022-PP: Cross-border risks and marine pollution) - [Dr. Emmanouil Kirtas, Georgios Panagopoulos]
- **Groundwater Resource management for non- potable water purposes, basement protection and heating- pilot application, (Acronym: GREEN PUMP)**, Interreg V-A Greece-Bulgaria 2014-2020 Cooperation Programme (European Regional Development Fund - ERDF and National cofinancing) - [Dr. Emmanouil Kirtas, Georgios panagopoulos]
- **Rapid Earthquake Damage Assessment Consortium (Acronym: REDACt)**, Black Sea Basin Joint Operational Programme 2014-20 co-financed by the European Union through the European Neighbourhood Instrument (ENI) and by the participating countries: Armenia, Bulgaria, Georgia, Greece, Republic of Moldova, Romania, Turkey and Ukraine - [Dr. Emmanouil Kirtas, Georgios Panagopoulos Dr. Panagiotis Koliopoulos, Dr. Eric Mouratidis, Ioannis Lialiabis]
- **Risk Assessment of Earthquake, Fire & Flood in the Attica Region**, funding: Region of Attica Region. Coordination: National Observatory of Athens. [Georgios Panagopoulos, Dr. Emmanouil Kirtas, Dr. Stavros Papaioannou]
- **Determination of dynamic response characteristics of cylindrical water storage tank**, funded by International Hellenic University, Internal Funds - [Dr. Emmanouil Kirtas]
- **Sustainable Urban Mobility Plans: Legal framework – International and Hellenic experience – Comparative assessment**, funded by Technical Chamber of Greece - [Dr. Athanasios Galanis]
- **ARCWIND: Adaptation and implementation of floating wind energy conversion technology for the Atlantic region**, funded by European Union: Horizon 2020 - [Dr. Constantine Michailides]
- **VTTV Jetty Monitoring**, funded by VTTV Cyprus - [Dr. Dr. Constantine Michailides]
- **A pan-European Network for Marine Renewable Energy (WECANet)**, funded by European Union: Horizon 2020 [Dr. Constantine Michailides]
- **EMERGE-East Med Energy Research for Growth and Education – Continuation Phase 2021 Programme**, funded by Ministry of Energy, Commerce, Industry and Tourism, Republic of Cyprus - [Dr. Constantine Michailides]
- **Hydromechanical properties of measured data for the Marina Ayia Napa coastal area**, funded by Cyprus Marine Environment Protection Association, Cyprus - [Dr. Constantine Michailides]
- **P.A.E.S.: Politische Abitative per l’Edilizia Sostenibile / Cooperation for innovation and exchange of good practices** (2015-18), ERASMUS+ (2015-18) - [Dr. Eleni Vlachonasiou, Dr. Maria N. Daniil]

These collaborations highlight the Department's commitment to advancing knowledge and contributing to the field of civil engineering through active research and international cooperation.

12.2 ERASMUS+ Mobility

Faculty members of the Department of Civil Engineering actively participate in the mobility program ERASMUS+. Examples of faculty mobility for teaching:

Université Paris-Est Marne-la-Vallée, France (2005-06) (Dr. Eric Mouratidis)

Vilnius Gediminas Technical University, Lithuania (2019-20) (Dr. Eleni Vlachonasiou)

At the same time, academic staff from foreign universities have visited the Department of Civil Engineering in Serres for teaching and bilateral cooperation within the framework of ERASMUS+. Example: visit from Université Paris-Est Marne-la-Vallée, academic year 2012-13.

The Department of Civil Engineering actively engages in the ERASMUS+ program for student mobility and exchanges (incoming and outgoing) with partner Universities. With the consolidation of the International Hellenic University and the transition to a unified management system for the ERASMUS+ program (through a digital platform), the Department of Civil Engineering is currently in a stage of renewing and establishing new bilateral agreements to continue and expand its mobility activities.

12.3 Mobility through Research Programs

The collaboration on research projects with foreign organizations and universities provides additional opportunities for partnerships that enhance mobility for the Department. Faculty members of the Department have traveled abroad for research projects, such as:

- Research project: P.A.E.S. (2015-18), 2017-19, Universita della Calabria, Italy and Transilvania University of Brasov, Roumania.
- Research project: GREEN PUMP (2014-20), 2020, South-West University 'Neofit Rilski', Blagoevrad, Bulgaria.
- Research project: Space4People (2020-22), 2022, URBACT City Festival 2022, France.
- Research project: REDACt (2014-20), 2022, Institute of Geology and Seismology IGS, Moldavia.

12.4 Scientific Events at the Department

The Department of Civil Engineering of I.H.U. has been actively involved in organizing scientific conferences, colloquiums and similar events in recent years, aiming to foster scientific discourse and promote knowledge. Invited speakers are faculty members from Hellenic and international universities, distinguished scientists and researchers in the field of Civil Engineering. These events serve as opportunities for the Department to reach out to the student community, the local society and the broader academic and scientific community. Figure 28 showcases posters of activities organized in recent years.

Fig. 28: Posters from scientific conferences, colloquiums and events of the Department (2015-today)

13. REFERENCES TO REGULATIONS OF THE DEPARTMENT AND THE UNIVERSITY

These are hyperlinks to Regulations of the Department of Civil Engineering and the International Hellenic University (in Greek):

Department of Civil Engineering	
Website of the Department of Civil Engineering	http://civil.ihu.gr/index.html
Internal Regulation of the Department of Civil Engineering	http://civil.ihu.gr/regulations/department.pdf
Regulation of Studies of the Department of Civil Egnineering	http://civil.ihu.gr/regulations/PPS.pdf
Regulation for the Preparation of the Diploma Dissetation	http://civil.ihu.gr/regulations/thesis_PPS.pdf
Regulation of Student Mobility at the Department of Civil Engineering	http://civil.ihu.gr/regulations/mobility.pdf
Student Complaints Policy and Procedure Regulation	http://civil.ihu.gr/regulations/complains.pdf
Regulation for the awardment of the 5-year Degree in Civil Engineering, I.H.U. for students completing studies of the former Department of Civil Engineering (former TEI Central Macedonia)	http://civil.ihu.gr/Kanonismos_TEI_PE.pdf
Regulation of Doctoral Studies of the Department of Civil Egnineering	http://civil.ihu.gr/PhD.html
International Hellenic University	
I.H.U. Regulations (Internal Regulation of the Institution, Regulation of the Dormitories, Pegulation of the Academic Advisors, Code of Ethics & Research).	https://www.ihu.gr/modip/εσωτερικοί-κανονισμοί
Regulation of the Central Library at the I.H.U)	https://www.ihu.gr/posts/post-17208

14. APPENDIX
CURRICULUM – DETAILED COURSES OUTLINE

The following pages present the Curriculum of the Department of Civil Engineering with detailed outlines of the courses.

1st Semester Courses

14.1.1 Linear Algebra and Analytical Geometry

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ002	**SEMESTER**	1st
COURSE TITLE	Linear Algebra and Analytical Geometry		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	3	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to use: 1. basic concepts in Linear Algebra (tables, determinants, linear systems – homogeneous/non homogeneous), vector transformations through an array (eigenvalues and eigenvectors, similarity transformations) 2. Vector analysis and vector operations 3. Basic concepts of Analytical Algebra on the level of surface theory for the field of Civil Engineering.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: - Working independently - Production of free, creative and inductive thinking

SYLLABUS

1.Introduction to Arrays and array operations, determinant of a square matrix .2. Calculation of determinant of greater dimension by analysis into sum of sub-determinants. 3. Allowed operations, calculation of determinant using the triangulation method. 4. Matrix multiplication, properties, permissible row operations on matrices. 5. Inverse of a square matrix and methods of inversion. 6. Linear systems. 7. The concept of vectors. 8. Vectors in space. 9-10. Analytical Geometry in the plane. 11. Analytical Geometry in space. 12. Elements of surface theory. 13. Vector transformations.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Poweroint presentations, Excel, Matlab/Octave, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)

Activity	***Semester workload***
Lectures	39
Individual study	
Practice/exercises	
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [in Greek]. Τερζίδης Χαράλαμπος, Λογισμός συναρτήσεων μιας μεταβλητής με στοιχεία διανυσματικής γραμμικής άλγεβρας, Εκδόσεις Χριστοδουλίδης, Θεσσαλονίκη 2006
- [In Greek]. Σουρλάς Δημήτρης, Γραμμική Άλγεβρα και Αναλυτική Γεωμετρία , Εκδόσεις Πανεπιστημίου Πατρών, 2013
- [In Greek]. Μπράτσος Αθανάσιος, Μαθήματα Ανώτερων Μαθηματικών, ISBN 978-960-603-030-7, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/424

[In Greek]. Παπαϊωάννου Σταύρος, Βογιατζή, Δέσποινα, Μαθηματικά I, ISBN 978-960-603-427-5, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/4551

14.1.2 Differential and Integral Calculus I

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΓΕΝ001	**SEMESTER**	1st	
COURSE TITLE	Differential and Integral Calculus I			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to use: 1. Sets of numbers with an emphasis on complex numbers 2. The real functions of a real variable (definition, limits, continuity) 3. Basic concepts of calculus 4. Basic concepts of differential calculus 5. Their implementations on the field of Civil Engineering.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Working independently
- Production of free, creative and inductive thinking

SYLLABUS

Course presentations: 1. Sets of numbers (natural, real, integer). Complex numbers (definition, complex plane, trigonometric form of a complex number, De Moivre's theorem, exponential form, Euler's formula). 2. The cartesian coordinate system, functions of a real variable, polynomial functions, properties. 3-4. Functions of a real variable, exponential and logarithmic functions, hyperbolic functions, properties, periodic functions, trigonometric and inverse circular functions, the concept of limit and the definition of a function of a real variable 5. The concept of derivative of a number and the derivative of a real variable 6-7. Derivative of a composite function, derivative of inverse functions, higher order derivatives, fundamental theorems, conclusions about f(x) derived from the first and second derivatives, extrema. Taylor and Maclaurin series, vector functions and their derivatives 8. Indefinite Integration, definition, basic types, and properties, methods of integration. 9. Methods of indefinite integration 10. Definite integration 11. Generalized integrals, integrals with variable limits and their differentiation, integration of functions defined on two intervals, integrals in polar coordinates, volume of a solid of revolution 12-13. Application of definite integration on the field of Civil Engineering.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Poweroint presentations, Excel, Matlab/Octave, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*	see table below

Activity	*Semester workload*
Lectures	52
Individual study	
Practice/exercises	

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)	

ATTACHED BIBLIOGRAPHY

[In Greek]. Τερζίδης Χαράλαμπος, Λογισμός συναρτήσεων μιας μεταβλητής με στοιχεία διανυσματικής γραμμικής άλγεβρας, Εκδόσεις Χριστοδουλίδης, Θεσσαλονίκη 2006
[In greek]. Hass J., Heil C., Weir M.D., Απειροστικός Λογισμός, Πανεπιστημιακές Εκδόσεις Κρήτης, Κρήτη 2005, ISBN 978-960-524-515-3, Κωδικός στον Εύδοξο: 77107082
[In greek]. Μπράτσος Αθανάσιος, Μαθήματα Ανώτερων Μαθηματικών, ISBN 978-960-603-030-7, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/424
[In greek} Παπαϊωάννου Σταύρος, Βογιατζή, Δέσποινα, Μαθηματικά Ι, ISBN 978-960-603-427-5, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/4551

14.1.3 Geodesy I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ001	**SEMESTER**	1st
COURSE TITLE	Geodesy I		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**	
Lectures and Practice	4	5	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and	Greek		

EXAMINATIONS:	
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
• Understand the principles of operation of basic surveying instruments. • Conduct field measurements using a theodolite and the tachymeter-stadia system. • Possess the theory of basic surveying applications: measurement of horizontal and vertical angles, distance measurement, photogrammetric mapping, geometric and trigonometric leveling, and apply them in practice. • Be able to draw topographic diagrams.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Decision-making _Working independently _Team work _Applying knowledge _Respect for difference and multiculturalism _Criticism and self-criticism _Production of free, creative and inductive thinking

SYLLABUS

Topics covered in the course include: Introduction to topography. Error theory. Instruments and methods for angle measurements. Instruments and methods for distance measurements. Instruments and methods for altitude differences measurements. Advances in instrument and measurement technology. Mapping of detailed points. Area and volume calculations. Land distribution. Production of a topographic diagram.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Inferential Assessment. • Laboratory assignment • Oral examination • Written final examination including: o Theoretical Extended Response Questions (formative and/or inferential) o Problem-solving exercises The present course description with the assessment criteria is accessible to students in the Department's Study Guide (Department Website).

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	26
Individual study	52
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- **[In Greek] Μαθήματα Γεωδαισίας, 2η Έκδοση, Γεωργόπουλος Γ., Εκδόσεις Τζιόλα.**
- **[In Greek] Γεωδαισία Ι: Γεωδαιτικές μετρήσεις και υπολογισμοί, Σαββαΐδης Π., Υφαντής Ι., Δούκας Ι., Εκδόσεις Κυριακίδη.**
- **[In Greek] Εφαρμοσμένη Γεωδαισία, Λάμπρου Ε., Πανταζής Γ., Εκδόσεις Ζήτη.**
- **[In Greek] Στοιχεία Τοπογραφίας, Στυλιανίδης Ε., Εκδόσεις Δίσιγμα.**
- **[In Greek] Εφαρμοσμένη Τοπογραφία, Τόμος Α', 3η Έκδοση, Καριώτης Γ., Παναγιωτόπουλος Ε., Εκδόσεις Δίσιγμα.**

14.1.4 Physics for Engineers

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ003	**SEMESTER**	1st
COURSE TITLE	Physics for Engineers		
INDEPENDENT TEACHING ACTIVITIES		**WEEKLY**	**CREDITS**

if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits	**TEACHING HOURS**	
	5	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://teachers.teicm.gr/vozikis/Physics/index.html

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to approach a problem qualitatively, analyze and interpret what is happening, plan the solution based on basic principles and mathematical tools, verify the results and identify possible improvements.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course promotes the following skills: - Working independently - Team work - Decision-making - Criticism and self-criticism - Production of free, creative and inductive thinking

SYLLABUS

Theory topics Mathematical background, Point mass mechanics, Rigid mass mechanics, Introduction to oscillations, Heat and temperature. Laboratory exercises aim to introduce students to the essence and correct practices of the experimental process, finding and correcting measurement errors, processing the results and deriving conclusions.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Webpage for the course, E-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity*** / ***Semester workload*** Lectures: 40 Practice/exercises: 19 Practice/exercises: 6 Project(s): 9 Individual study: 82 Course total (26 hours workload per ECTS credit): ***156***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Theory examination (90%) - mid-term exmams: open ended questions, problem solving questions (30%) - final exams: open ended questions, problem solving questions (60%) Laboratory exams (10%) Written assignment for every laboratory exercise.

ATTACHED BIBLIOGRAPHY

[In Greek]. Young H., Freedman R., University Physics with Modern Physics – Vol A, Papazisi (Ed), 2009, ISBN:978-960-02-2338-5
[In Greek]. Halliday D., Resnick R., Walker J., Physics – Vol A, Gutenberg (Ed.), 2012, ISBN:978- 960-01-1493-5
[In Greek]. Fragiadakis, I., Physics and Technology, Ziti (Ed.) 2006, ISBN:960-431-854-3
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[In Greek]. Kleidis, K. Vozikis, C., Physics – Engineering, TEI Central Macedonia 2017, http://teachers.teicm.gr/vozikis/Physics/theory/Physics-notes.pdf

14.1.5 Technical Drawing

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ001	**SEMESTER**	1st
COURSE TITLE	Technical Drawing		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures, exercises.	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to corelate real world geometry with graphic representations through projection, observe geometric principles in the built environment and relate them to graphic representations, represent 3D objects in 2D orthographic projections, produce hand-drawing projections of buildings in scale (plans, sections, elevations), use lineweights to convey spatial information, identify building components in orthographic drawings, read symbols related to the structure and the building components, organize drawings in sheets and place appropriate dimensions for drawings in the scale of 1:50.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment

Decision-making *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

Search for, analysis and synthesis of data and information, with the use of the necessary technology, Project planning and management
Adapting to new situations, Decision-making, Working independently, Team work, Production of free, creative and inductive thinking.

SYLLABUS

The course is structured in two parts: the first part is dedicated to introducing the main principles of descriptive geometry and the relation of physical objects with their geometrical representation on paper. Students work on exercises on descriptive geometry, surface developments and orthographic projections. The second part implements the orthographic projections on the drawing of objects is space. The students learn to measure, document and produce orthographic projections of physical objects in scale drawings (1:5). They learn to make orthographic projections of buildings in scale (1:100, 1:50), axonometric projections, while at the same time they get acquainted with the building's structure and components. The students submit 3 projects of paper and ink drawings at the end of the semester, while they also participate in a final examination on technical drawing.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Compulsory individual assignements.(40% of final grade) Final written examinations: short-answer questions, drawing assignment (60% of final grade).

Activity	*Semester workload*
Lectures	26
Practice/exercises	26
Practice/exercises	
Individual study	35
Project(s)	43
Course total (26 hours workload per ECTS credit)	***130***

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Markatis, S., “Descriptive Geometry”, TSOTRAS Publications, Athens, 2016. (in Greek)
Fountas, Gr., “Descriptive Geometry”, Fountas Publications, Athens, 2005. (in Greek)
Lefkaditis, G., “Elements of Descriptive Geometry Part I”, private publication, Athens, 2010. (in Greek)
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Lefkaditis, G., “Methods of Representation: Axonometry, Altimetry, Rendering”, private publication, Athens, 2006. (in Greek)
Ching Fr., “Architectural Graphics”, 6th edition, John Wiley and Sons, Inc., New Jersey, 2015

14.1.6 Building Materials Technology I

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ002	**SEMESTER**	1st	
COURSE TITLE	Building Materials Technology I			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of* *the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course, students should be able to identify:
the properties of building materials, manufacturing technologies, structure
correlation and properties and the mechanical behavior of building materials.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Autonomously working, Teamwork, Decision making, Exercise criticism and self-criticism, Promotion of free, creative and inductive thinking

SYLLABUS

• Introduction to the structure of materials. Physical and mechanical properties.
• Characteristics, properties of natural stones and rocks.
• Structural rocks - Aggregate materials: Types, characteristics and properties.
• Powders: Definitions, Types, Production methods, Coagulation and hardening mechanisms. Aerial and
hydraulic powders.
• Cement: Raw materials, Production, Portland cement. Hydration. Special types of cements.
• Pozzolanic reaction. Physical, chemical and mechanical properties of cements. • Mortars: Composition. Categories. Properties - characteristics (Adhesion, strength, durability).
• Introduction to masonry (Types, strengths).
• Ceramic Materials (Optobricks: Properties, Strengths).
• Introduction to concrete.
• Introduction to steel materials.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational*	

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	52
Individual study	
Educational visit	

visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*		
	Course total (26 hours workload per ECTS credit)	***104***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The final written exam at the end of the semester comprises: Theoretical questions of knowledge and critical thinking, problem solving.	

ATTACHED BIBLIOGRAPHY

[In Greek] A. Triantafyllou, (2017). Structural Materials, GOTSIS Publishers.
[In Greek] P. Kumar Mehta, P.J.M. Monteiro. Concrete: Microstructure, Properties, and Materials, Publ. McGraw Hill.

14.1.7 Basic IT tools - Writing scientific documents

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ009	**SEMESTER**	1st
COURSE TITLE	Basic IT tools - Writing scientific documents		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	1	0
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Knowledge
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to explain computer functions and operations, outline the benefits for civil engineers, choose and evaluate Internet resources, comply with third-party intellectual rights.
General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim? *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course promotes the following skills: - Working independently - Team work - Decision-making - Criticism and self-criticism - Production of free, creative and inductive thinking

SYLLABUS

Computer operating systems, Windows basic operations, introduction to Word, (equations, tables, images, shapes, alignment, headers, footers), Introduction to Excel (programming simple problems, graphical representations and processing of experimental data and functions,), IF command, solving problems in Linear Algebra using predefined functions, rules for writing scientific texts, structure of a scientific assignment, bibliography and references, searching scientific databases, intellectual rights and plagiarism (use of third-party text, images, shapes), references in text.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, course webpage, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	***Semester workload***
Lectures	

Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Individual study Course total (26 hours workload per ECTS credit)	 ***0***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final examination (, open ended questions, problem solving questions)	

ATTACHED BIBLIOGRAPHY

[In Greek]. Kavousanos, E., Applications of mathematical calculus - Excel presentations, Benou (Ed.), - Παρουσίαση με την χρήση του excel, Εκδόσεις Μπένου, 2012, ISBN: 978-960-8249-93-6
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[In Greek]. Vozikis Christos, Intellectual property rights: clearing Open Academic Courses from third-party Intellectual property rights., TEI Central Macedonia Creative Commons: Attribution-ShareAlike 4.0

2nd Semester Courses

14.2.1. Engineering Mechanics I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ004	**SEMESTER**	2nd
COURSE TITLE	Engineering Mechanics I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Students' understanding of the effect of forces and moments on the static equilibrium of planar linear undeformed structures. The development of static sensing on the adequacy of links with the view to achieve rigid and determinate truss structures. The ability to calculate and evaluate the axial forces developed in the members of truss structures and the displacements of the nodes.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and	*Project planning and management*

information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
Creating the necessary background to enable a full understanding of the concepts and techniques of static solution of truss structures and of the calculation of the center of gravity of surfaces.	

SYLLABUS

- Introduction to Engineering. Principles of vector calculus. Force and moment. Moment of a force with reference to a point and about an axis. Force couple. Parallel force transfer. Reduction of a system of forces.
- Composition of concurrent and parallel forces – graphic and analytical calculation of the resultant. Decomposition of forces into components. Forces in space.
- Calculation of the area of surfaces and determining the center of gravity of simple and complex surfaces.
- Rigid body equilibrium conditions. Mechanisms, determinate and indeterminate structures, degrees of freedom, types of supports of structures.
- Free-body diagram. Calculation of support reactions.
- Truss structures. Formation - members. Analytical method of nodes. The method of Ritter sections.
- Complex trusses. Three-hinge trusses.
- Principle of virtual work. Calculation of node displacements of truss

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation,*	1. Assignment of tasks in order to investigate the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to check his examination paper and have his mistakes analyzed.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- http://users.teilar.gr/~p.lokkas/Stat.pdf
- [in Greek] Βαρδουλάκη Ι., Γιαννακόπουλου Α. «Τεχνική Μηχανική Ι», Εκδόσεις Συμμετρία 2004.
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- [in Greek] Π. Βουθούνη. «Μηχανική Απαραμόρφωτου Στερεού», Εκδόσεις Α. Βουθούνη, 2017.
- [in Greek] Beer F., Johnston E.R., Mazurek D., «Στατική – Τεχνική Μηχανική», Εκδόσεις Τζιόλα, 2018
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- Hassan Al Nageim, «Structural Mechanics: Loads, Analysis, Design and Materials», Prentice Hall, 2003.
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- Hulse, R. Cain, J., «Structural Mechanics», Macmillan, 1994.

14.2.2. Probabilities and Statistics

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΓΕΝ005		**SEMESTER**	2nd
COURSE TITLE	Probabilities and Statistics			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			3	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to use combinatorial analysis, theory of probability, basic consensus statistics, basic distribution functions, implement in valuation issues and use regression-correlation.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Working independently
- Production of free, creative and inductive thinking

SYLLABUS

Combinatorial analysis, basic concepts in Statistics, census statistics, statistical measures of central tendency, probabilities (concepts and exercises), probability distribution functions in discrete random variables, polynomial and exponential probability distribution functions, valuation, confidence intervals for the difference of means, fundamentals of time series.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Poweroint presentations, Excel, Matlab/Octave, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)

Activity	*Semester workload*
Lectures	39
Individual study	
Practice/exercises	
Course total (26 hours workload per ECTS credit)	***104***

evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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[In Greek] Zafeiropoulos, K., Introduction to Statistics and probabilities, Kritiki (Ed), Thessaloniki, 2017, ISBN: 9789605861476

[In Greek] Chalikias, I., Statistics: method of analysis for business decisions, Rosili (Ed). Athens, 2017.

[In Greek] Zafeiropoulos, K., Mylonas, N., Statistic with SPSS, Tziolas (Ed). Thessaloniki, 2017, ISBN 9789604186808

[In Greek] Papaioannou, S. Course notes: http://pde.teiser.gr/papaioannou/stoixia_pithanotiton_statistikis.asp

14.2.3. Differential and Integral Calculus II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ004	**SEMESTER**	2nd
COURSE TITLE	Differential and Integral Calculus II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to use: functions of most variables and recognize their graphic representations 2. The concepts of partial derivative and total differential 3. The solving of double and triple integrals 4. Basic concepts of Differential Geometry 5. Line integrals and surface integrals. 6. Implement the above in the field of Civil Engineering.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Working independently
- Production of free, creative and inductive thinking

SYLLABUS

Course content: 1. Introduction to functions of two real variables, examples of graphical representations, sphere, ellipsoid, paraboloid, cone, intersection of surfaces and planes, domain and definition of continuity for z=f(x, y). 2. The concept of partial derivative, physical and geometric interpretation, types and theorems of partial derivatives. The concept of total differential, higher-order partial derivatives. 3. Study of extrema, the problem of least squares, constrained extrema 4. Double Integrals, their physical and geometric interpretation, properties, and methods of computation. Types of integration domains 5. Double integrals, change of variables. Polar Coordinates. Generalization of the Change of Variables Problem, moment of Inertia of a Plane Surface. 6. Triple Integrals. Physical Interpretation. Properties and Computation Methods 7-9. Fundamental knowledge of vector analysis: scalar and vector fields, vector functions. Derivative of a vector function. Angular velocity. Uniform circular motion. Arc length of a curve. Derivative of z=f(x,y) in a given direction. Integration of vector functions. Gradient of scalar fields. Divergence and curl of vector fields 10-11. Line integrals (definition, properties and calculation methods). Path-independent line integrals. Conservative vector fields. 12. Surface integrals (definition, properties and calculation methods). 13. Stokes' theorem and Gauss's Divergence theorem.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Poweroint presentations, Excel, Matlab/Octave, E-learning platform for educational material.
TEACHING METHODS	***Activity*** | ***Semester workload***

The manner and methods of teaching are described in detail. *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><td>Lectures</td><td>52</td></tr><tr><td>Individual study</td><td></td></tr><tr><td>Practice/exercises</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***130***</td></tr></table>
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)

ATTACHED BIBLIOGRAPHY

[In Greek]. Τερζίδης Χαράλαμπος, Λογισμός συναρτήσεων μιας μεταβλητής με στοιχεία διανυσματικής γραμμικής άλγεβρας, Εκδόσεις Χριστοδουλίδης, Θεσσαλονίκη 2006
[In greek]. Hass J., Heil C., Weir M.D., Απειροστικός Λογισμός, Πανεπιστημιακές Εκδόσεις Κρήτης, Κρήτη 2005, ISBN 978-960-524-515-3, Κωδικός στον Εύδοξο: 77107082
[In greek]. Μπράτσος Αθανάσιος, Μαθήματα Ανώτερων Μαθηματικών, ISBN 978-960-603-030-7, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/424
[In greek} Παπαϊωάννου Σταύρος, Βογιατζή, Δέσποινα, Μαθηματικά Ι, ISBN 978-960-603-427-5, [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Ηλεκτρονική Διεύθυνση: https://repository.kallipos.gr/handle/11419/4551

14.2.4. Geodesy II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ002	**SEMESTER**	2nd
COURSE TITLE	Geodesy II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, the student will be able to: • use basic knowledge on reference systems and coordinate transformations and be able to convert basic topographic quantities into different reference surfaces. • perform topographic measurements by conducting polygonal traverses, calculating coordinates of detailed points using specific methods. • apply different methods of leveling determination, such as simple geometric leveling, trigonometric leveling, precise trigonometric leveling, etc. • design topographic diagrams and be able to mark topography points in a land field.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: -Team work -Applying knowledge -Working in an interdisciplinary environment

SYLLABUS

Topics covered in the course include: - Transform coordinates between different coordinate systems - Describe the characteristics of geodetic datums and projection systems - Apply in practice the proccedures involved in tacheometric surveying - Apply different leveling techniques such as differential and trigonometric leveling.

- Create survey plans and find the location a of specific points on the construction site - Polygonometry method. resection and intersection traverse. - Surveying Definition, Types, Methods and checks.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Inferential Assessment. • Laboratory assignment • Oral examination • Written final examination including: o Theoretical Extended Response Questions (formative and/or inferential) o Problem-solving exercises The present course description with the assessment criteria is accessible to students in the Department's Study Guide (Department Website).

Activity	***Semester workload***
Lectures	39
Practice/exercises	26
Project(s)	26
Individual study	39
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek] Εφαρμοσμένη Γεωδαισία, Λάμπρου Ε., Πανταζής Γ., Εκδόσεις Ζήτη.
- [In Greek] Μαθήματα Γεωδαισίας, 2η Έκδοση, Γεωργόπουλος Γ, Εκδόσεις Τζιόλα.
- [In Greek] Γεωδαισία ΙΙ: Τοπογραφικές Αποτυπώσεις -Χαράξεις, Σαββαϊδης Π., Υφαντής Ι., Δούκας Ι., Εκδόσεις Κυριακίδη.
- [In Greek] Εφαρμοσμένη Τοπογραφία, Τόμος Β’, 2η Έκδοση, Παναγιωτόπουλος Ε., Καριώτης Γ., Συμεωνίδης Π., Εκδόσεις Δίσιγμα.

14.2.5. Constructional Drawing through Computer Aided Design

GENERAL

SCHOOL	Engineering
ACADEMIC UNIT	CIVIL ENGINEERING
LEVEL OF STUDIES	Undergraduate

COURSE CODE	ΔΟΜ003		**SEMESTER**	2nd	
COURSE TITLE	Constructional Drawing through Computer Aided Design				
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**		**CREDITS**
Lectures, exercises, assignements.			4		4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).					
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background				
PREREQUISITE COURSES:					
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek				
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No				
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able create 2D digital drawings of buildings (plans, sections, elevations) as well as masterplans of their surrounding area. Drawings are to be complete with constructional information for the scale of 1:50. They should be able to organize layouts, sheet drawings, plot and publish them respectively, exchange files and share information through .dwg files, keep up with software updates and finally establish a background for engaging with similar CAD systems.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:

Search for, analysis and synthesis of data and information, with the use of the necessary technology,

Adapting to new situations, Decision-making, Working independently, Team work, Working in an international environment, Working in an interdisciplinary environment, Production of new research ideas, Criticism and self-criticism, Production of free, Creative and inductive thinking.

SYLLABUS

The course introduces students to AutoCAD software in order to provide them with the knowledge and skill to digitally design 2D representations of buildings, working through scales of 1/100 to 1/50. Students learn thoroughly Drawing and Modify commands, along with Annotations, Dimensioning and Insertion options, achieving accuracy with Drafting Settings and supporting all architectural drafting conventions. Drawings are plotted in scales, organised in layouts and sheets to be published. Students also learn to organize project files, templates and exchange efficiently drawing information within AutoCAD environment as well as with other applications.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Compulsory individual assignements. (20% of final grade) Final examination: short-answer questions, multiple choice, drawing assignment in AutoCAD (80% of final grade).

Activity	*Semester workload*
Lectures	13
Practice/exercises	28
Project(s)	24
Individual study	39
Course total (26 hours workload per ECTS credit)	***104***

ATTACHED BIBLIOGRAPHY

Malikouti, St., Markopoulou, N., “ARCHITECTURAL DRAWING: Methodology for drawing in scale of 1:50”, Sygxroni Publications, Athens, 2017. (in Greek)
Omura, G., Benton, B.C., “Mastering AutoCAD 2019 and AutoCAD LT 2019”, Sybex, 1st edition, 2018.
Kappos, I. “Working with AutoCAD 2017”, Kleidarithmos Publications, Athems 2017. (in Greek)
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Tzouvadakis, I., Gousis, Ch., “2D 3D drawing in AutoCAD”, Symmetria Publications, Athens, 2007. (In Greek).
Veneris, I., “INFORMATICS AND ARCHITECTURE: concepts and technologies”, Tziolas Publications, Thessaloniki, 2011. (In Greek).
Kourniatis, N., “Techniques of representation with geometrical methods and contemporary digital media”, Tziolas Publications, Thessaloniki, 2018. (In Greek).

14.2.6. Computer Programming

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ006	**SEMESTER**	2nd
COURSE TITLE	Computer Programming		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	3	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to define the way computers work, basic principles of programming, the value of computers for civil engineering, build short programs for engineering applications, calculate numerical problems for civil engineering though computer programming.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Working independently
- Team work
- Decision-making
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Introduction to programming. Algorithms and flowcharts. Matlab environment (Octave). Command line. Constants, variables, arrays, library functions. Arithmetic operations with scalar variables and arrays. Help commands and files. Writing programs. .m Files. Input and output commands (input, disp, fprintf). User-defined functions using inline. Program execution. Debugging. Decision-making statements (if, switch). Looping statements (for, while). Counters, accumulators. Array indexing. Graphical representations. Plotting commands (plot, figure, hold, axis, xlabel, ylabel, title, plot3). 3D graphs (meshgrid, mesh, surf, contour). User-defined functions using the 'function' keyword. function calls. recursion. Data files, reading, writing. Symbolic toolbox. Symbolic variables, functions, roots, derivatives, integrals, differential equations. Data modeling: curve fitting, curve fitting in Matlab

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The course is taght in a computer cluster room with Matlab/(Octave clone) and open source GNU
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation,*	Written final examination (50% of the final grade) that includes: • Open ended questions • Problem-solving exercises • Group written assignment (2/3 students) (30% of the final grade) • Individual laboratory work during the

Activity	*Semester workload*
Lectures	13
Practice/exercises	26
Individual study	39
Course total (26 hours workload per ECTS credit)	***78***

other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	course (20% of the final grade).

ATTACHED BIBLIOGRAPHY

-[In Greek]. Γραββάνης Γιώργος, Γιαννουτάκης Κωνσταντίνος, Προγραμματισμός με τη Χρήση Matlab, Εκδόσεις Α. ΠΑΠΑΣΩΤΗΡΙΟΥ ΣΙΑ ΟΕ, 2012, ISBN: 978-960-491-057-1

-[In Greek]. Stormy Attaway, Matlab: Μια πρακτική εισαγωγή στον προγραμματισμό και την επίλυση προβλημάτων, Εκδόσεις Κλειδάριθμος ΕΠΕ, 2016, ISBN: 978-960-461-663-3

-[In Greek]. Musto J., Howard W., Williams R., Υπολογιστική Μηχανική με Matlab και Excel, Εκδόσεις Τζιόλα, 2015, ISBN: 978-960-418-504-7

14.2.7. Building Materials Technology II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ005	**SEMESTER**	2nd
COURSE TITLE	Building Materials Technology II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*

• *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to have an in-depth knowledge of concrete and steel reinforcement properties and apply concrete and steel regulations and criteria.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
Autonomously working, Teamwork, Decision making, Exercise criticism and self-criticism, Promotion of free, creative and inductive thinking

SYLLABUS

• Concrete: Raw materials, additives and admixtures. Composition study - Grainometric curves. • Freshly-mixed concrete: Properties, Distribution, Placing, Maintenance, Taking samples. Using concrete in special conditions.• Hardened concrete: Microstructure. Strengths, Volume stability. Durability. Compliance Criteria, Acceptance of a Load or Batch of Concrete.• Special Concretes: Self-Compacting, High Strength, Reinforced, Gunite. •Steel Reinforcement: Production methods, nomenclature, Properties and technical characteristics. Corrosion. Steel welding. Quality compliance of steel reinforcement. Forming of steel reinforcement in constructions. • Concrete and Steel Regulations.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity***	***Semester workload***
	Lectures	26
	Practice/exercises	26
	Individual study	52
	Practice/exercises	
	Educational visit	
	Course total (26 hours workload per ECTS credit)	***104***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure*	The final written exam at the end of the semester comprises: Theoretical questions of knowledge and critical	

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	thinking, problem solving.

ATTACHED BIBLIOGRAPHY

[In Greek] A. Triantafyllou, (2017). Structural Materials, GOTSIS Publishers.
[In Greek] P. Kumar Mehta, P.J.M. Monteiro. Concrete: Microstructure, Properties, and Materials, Publ. McGraw Hill.

3rd Semester Courses

14.3.1. Geology for Engineers

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ001	**SEMESTER**	3rd
COURSE TITLE	Geology for Engineers		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Process, analyze, and utilize information related to the role of geological formations and structures, as well as groundwater, in the environment and in technical projects.
- Evaluate the geotechnical behavior of geological formations under different conditions.
- Assess potential geotechnical hazards and make decisions regarding preventive measures and/or mitigation.
- Evaluate environmental parameters and hazards based on the hydrogeological and mechanical characteristics of geological formations.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

Search for, analysis and synthesis of data and information, using the necessary technologies

- Work in an interdisciplinary environment
- Autonomous work
- Decision making
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Content of lectures:
-Creation-composition and evolution of the earth, theory of lithospheric plates.
-General Geology (stratigraphy, tectonics, fundamental concepts, illustrations on maps).
-Geomorphology, disintegration, erosion, karst phenomena with an emphasis on their effects on the environment and on technical projects.
-Earthquakes. Genesis, valuation, seismic risk, effects on technical projects and the environment.
-Geotechnical problems: groundwater, landslides, settlements and effects on technical projects .
-Classifications of geological formations. Rock mass classification (RQD, GSI)
Exercise Contents:
-Geometric orientation of geological interfaces
-Topographic maps
-Construction of geological sections
-Geological Sections and assessment of subsoil geotechnical conditions
-Rock mass classification

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	-Additional material is provided via a dedicated e-learning website -Zoom platform -Communication via e-mail
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Practice/exercises</td><td>26</td></tr><tr><td>Individual study</td><td>52</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***104***</td></tr></table>
STUDENT PERFORMANCE EVALUATION	-Final written exam at the end of the semester that

Description of the evaluation procedure *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	comprises: -Theoretical questions of knowledge and critical thimking, problem solving, multiple choice test. -Individual project

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2. [In Greek]. Seraphim Savvidis. Environmental Engineering Geology. S.G.S. Publications Seraphim G. Savvidis, Kozani 2014. ISBN: 978-618-80374-0-3
3. [In Greek]. Dimitris Papanikolaou, Geology, The Science of the Earth, S. Patakis Publications, 2007.
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5. John C. Lommler. Geotechnical Problem Solving. John Wiley Sons, 2012.

14.3.2. Theory of Elasticity

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ006	**SEMESTER**	3rd	
COURSE TITLE	Theory of Elasticity			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
The familiarization of students with the concepts of stress and strain in continuous elastic media and the stress-strain relationship in the elastic region. Understanding the equilibrium and compatibility equations. The use of boundary conditions. The ability to apply analytical, energy, and numerical methods to determine deformations in truss and solid structures.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Stresses. Normal and shear stress. Stress tensor. Equations of equilibrium.
• Basic principles of elasticity – plasticity. Continuous media. Homogeneous – isotropic materials. Small and large deformations. Second-order phenomena. Static and dynamic loads.
• Change of coordinate system. Transformation of stresses.
• Principal stresses – principal axes. Mohr's circles. Invariants of stresses. Three-dimensional and plane stress state.
• Deformations. Strain tensor. Laws of material behavior, stress-strain relationship. Compatibility equations.
• Linear elasticity. Constitutive equations. Mechanical characteristics of materials. Hooke's law. Modulus of elasticity. Poisson's ratio. Shear modulus. Elasto-plastic materials.
• Properties of fluids. Viscosity.
• Boundary conditions. Principle of superposition. Saint Venant's principle. Plane stress state. Plane strain state.
• Airy stress function. Solving two-dimensional problems in orthogonal and polar coordinates. Boundary conditions.

• Lamé's constants. Elasticity equations. P and S wave velocities. Speeds of propagation.
• Energy methods. Strain energy. Maxwell - Betti reciprocity theorem. Castigliano's theorem.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

Activity	*Semester workload*
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

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Timoshenko S, Goodier G.N. «Theory of Elasticity», McGraw-Hill, 1969.
Timoshenko S, «Theory of Elasticity», McGraw-Hill, 1987.
L. D. Landau, E. M. Lifshitz, «Theory of Elasticity», Pergamon Press, 1989.
A.I. Lurie, «Theory of Elasticity», Springer Science Business Media, 2010.

14.3.3. Environmental Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ001	**SEMESTER**	3rd

COURSE TITLE	Environmental Engineering		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- know the concepts of climate change, the ozone hole, acid rain
- understand the conditions of air pollution and water pollution
- know the processes of wastewater treatment
- design a sewage treatment plant
- dimension the sewage treatment tanks
- be aware of the limitations and peculiarities in the construction of such projects
- know the limits of pollutants that can be discharged from a Wastewater Treatment Plant

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

• Decision making • Respect for the natural environment • Autonomous work • Adaptation to new situations

SYLLABUS

• Principles of aerosol cleaning. Emission sources of pollutants in the atmosphere. Removal of gaseous pollutants. Particulate removal from static source emissions. Technologies for destroying pollutants emitted by mobile sources • Principles - methods of water treatment. Quality of potable water • Solid waste management and processing. Management of urban waste • Climate change, ozone hole, acid rain • Toxic substances, asbestos, lead, dioxins • Principles of biological wastewater and sludge treatment. Environmental biochemistry-biotechnology elements: Microorganisms, biochemical reaction kinetics. Wastewater treatment technology: Qualitative and quantitative characteristics of wastewater. Sewage treatment. Separation grids. Sand collectors. Physico-chemical treatment. Sedimentation tanks. Biological processes of suspended and attached biomass. Natural wastewater treatment systems. Disinfection. Sludge treatment technology: Qualitative and quantitative characteristics of sludge. Sludge thickening. Sludge immobilization/digestion. Dewatering, drying, and burning of sludge. Final disposal and/or reuse of treated wastewater and sludge.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity***	***Semester workload***
	Lectures	52
	Individual study	26
	Course total (26 hours workload per ECTS credit)	***78***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring understanding of concepts taught. 2. Final written exam at the end of the semester (in Greek).	

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• Ath. Kougolou "ENVIRONMENTAL ENGINEERING, Pollution Environmental Protection", Tziolas Publications, 2018, ISBN: 9789604185627 [in Greek]
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• R Wane Schneiter "Environmental Engineering Practice PE Exams", Professional Publications Inc, 2007, ISBN: 1591260019

14.3.4. Building Construction I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ007	**SEMESTER**	3rd
COURSE TITLE	Building Construction I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*

- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the student will be able to:
- understand the principal parts of a building construction: excavations, foundations, bearing structure of buildings, masonry, thermal and moisture protection, roofs, stairs, floors
- read and create construction drawings
- search relevant information over building construction issues in a variety of sources (books, scientific papers, internet sites)
- implement the aforementioned information for solving building construction issues in a documented way (detailed drawings, technical reports)
- perceive the knoweledge received as a part of the whole building construction planning and utilize it construction

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Research, analysis and combination of information
- Adaptation to new situations
- Decision making
- Autonomous and team work
- Project planning and performing
- Respect to natural environment
- Critical mindset
- Promotion of creative and inductive thinking

SYLLABUS

The course is an introduction to Building Construction and aims to develop the logic of solving construction problems in a building project. Introduces theoretical and technical knowledge on issues of insulation, building materials as well as the relationship between design and construction. An introduction is also made to the concept of the energy performance of the building, its energy footprint and the regulations governing them.
Students work on a project, both individually and in groups. For this project they are given drafts of a building and are asked to proceed with the design of the basic construction plans (wooden formwork, joints and details of structural elements, drawing of stairs, roofs), incorporating the insulation required in every element. Moreover, they are invited to cultivate the logic of searching for construction solutions through the combination of knowledge and information received from a variety of sources: books, technical brochures, examples of constructed buildings on the Internet. Their proposal should be substantiated theoretically and design-wise.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Powerpoint presentation of lectures • Support of the learning process (educational material) through the E-learning platform and a video conference platform.

TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	*Semester workload*
Lectures	25
Practice/exercises	25
Individual study	30
Project(s)	30
Project(s)	20
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exams on theory and design, with questions of short development on construction issues, as well as solving a small design project (50%) Delivery of group project (mandatory), which is processed during the semester, with supervision of each group throughout the whole semester (50%)

ATTACHED BIBLIOGRAPHY

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• [IN GREEK] Καλογεράς Ν., Κιρπότιν Χ., Μακρής Γ., Παπαϊωάννου Ι., Ραυτόπουλος Σ., Τζίτζας Μ.,
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• KTIPIO [http://www.ktirio.gr/]

14.3.5. Differential Equations

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ007	**SEMESTER**	3rd
COURSE TITLE	Differential Equations		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g.*	**WEEKLY TEACHING**	**CREDITS**

lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits	**HOURS**	
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to work with the definition of differential equations for usual problems, differential equations of 1st order, linear differential equations of 2nd order with constant coefficients, the concept and method of solving of the monophase oscillator, linear systems of differential equations, the concept and method of solving of he bilevel oscillator, Fourier series and Laplace transforms.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills:
- Working independently
- Production of free, creative and inductive thinking

SYLLABUS

Introduction to differential equations, differential equations of 1st order, (homogeneous, linear, Bernoulli, complete, Ricatti) differential equations of 2nd order (constant coefficients, single stage forced oscillator), systems of differential equations, method of solving of he bilevel oscillator, Fourier series and Laplace transforms.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Poweroint presentations, Excel, Matlab/Octave, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)

Activity	***Semester workload***
Lectures	52
Individual study	
Practice/exercises	
Course total (26 hours workload per ECTS credit)	***130***

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14.3.6. Engineering Mechanics II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ008	**SEMESTER**	3rd
COURSE TITLE	Engineering Mechanics II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Students' understanding of the concept of external loads and their connection to the internal forces developed in planar solid undeformed structures. The possibility of identifying and forming statically determinate beams - frames. The ability to calculate and evaluate the axial - shear forces and bending moments that develop in the members of the solid structures. The ability to determine critical sections. The application of energy methods for the calculation of displacements - rotations of cross-sections of solid structures.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Acquisition of specialized knowledge for the conception, design and static solution of solid determinate structures, calculation of internal forces and critical sections.

SYLLABUS

- Solid structures. Internal Forces. Beams – Frames.
- Concentrated and distributed loads. Method of sections. Diagrams of internal forces N, V, M

and their properties.
- Simply supported beam and diagrams of internal forces for various types of loading. Single and double cantilever simply supported beam. Cantilever beam.
- Substitute beam. Construction of N, V, M beam diagrams with the beam substitute method and the method of integrals.
- Hinged beam (Gerber). Reactions, N, V, M diagrams.
- Static solution of solid and hinged determinate frame structures.
- Principle of virtual work. Calculation of displacements – rotations of cross sections of solid structures.
- Application of the direct stiffness method to calculate the displacements of trusses.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks in order to investigate the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to check his examination paper and have his mistakes analyzed.

ATTACHED BIBLIOGRAPHY

- http://users.teilar.gr/~p.lokkas/Stat.pdf
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- Hassan Al Nageim, «Structural Mechanics: Loads, Analysis, Design and Materials», Prentice Hall, 2003.
- R. Hulse, «Structural Mechanics», Red Globe Press, 2000.
- Hulse, R. Cain, J., «Structural Mechanics», Macmillan, 1994.

14.3.7. Traffic Engineering

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΣΥΓ003		**SEMESTER**	3rd
COURSE TITLE	Traffic Engineering			

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=480

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to recognize the traffic flow variables and their mathematical relations as well as concepts of traffic capacity, calculate traffic capacity and level of service of basic road elements, to calculate a signalized intersection and implement methods of traffic data collection.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Trip generation and characteristics, land transportation system, traffic flow variables, traffic volume and flow rate, speed, traffic density and occupancy, space headway and time headway, time-space diagrams, fundamental traffic flow relationship, traffic flow diagrams, patterns and statistical distributions of traffic flow, traffic capacity, level of service, interrupted and uninterrupted flow, service flow rate, performance measures and service measures, demand and volume, functional classification of road networks, cross sections, urban roads, classification of urban roads, speeds, levels of service, service volumes, calculation of traffic capacity (unsignalized intersections, two lane highways, multilane highways, basic freeway segments, freeway weaving, ramps and ramp junctions), traffic signalization, warrants, traffic signal design, traffic light coordination, traffic data collection methods.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	52
Course total (26 hours workload per ECTS credit)	***104***

ATTACHED BIBLIOGRAPHY

- [In Greek] Αντωνίου, Κ., Σπυροπούλου, Ι. (2016). Αρχές Κυκλοφοριακής Τεχνικής και Προσομοίωσης.

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• [In Greek] Φραντζεσκάκης, Ι.Μ., Γκόλιας, Ι.Κ., Πιτσιάβα-Λατινοπούλου, Μ.Χ. (2009). Κυκλοφοριακή Τεχνική. Α. ΠΑΠΑΣΩΤΗΡΙΟΥ ΣΙΑ Ι.Κ.Ε., ISBN: 978-960-7182-42-5.
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• [In Greek] Φραντζεσκάκης, Ι.Μ., Πιτσιάβα-Λατινοπούλου, Μ.Χ., Τσαμπούλας, Δ.Α. (2002). Διαχείριση Κυκλοφορίας. Α. ΠΑΠΑΣΩΤΗΡΙΟΥ ΣΙΑ Ι.Κ.Ε., ISBN: 978-960-7510-50-1.
• [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 1: Λειτουργική Κατάταξη Οδικού Δικτύου (ΟΜΟΕ-ΛΚΟΔ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
• [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 2: Διατομές (ΟΜΟΕ-Δ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
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4th Semester Courses

14.4.1. Strength of Materials

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ009	**SEMESTER**	4th
COURSE TITLE	Strength of Materials		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

- Evaluation of materials according to the laws of behavior.
- Understanding the response and behaviour due to various loads.
- Ability to dimension structural elements. Selection of critical sections.
- Calculation of deformations - displacements.
- Assessment of structural material failure.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Classification of materials. Behavior law of structural steel. Proportional limit, elasticity, and yield point. Strengthening. Necking phenomenon. Behavior law of ductile materials.
• Bending theory: Moment of inertia. Pure bending. Bending with axial force. Biaxial bending. Neutral axis. Cross-section core.
• Pure shear. Shear due to bending of symmetrical sections. Distribution of shear stresses along the height.
• Elastic line of a beam. Calculation of the elastic line - deflection of beams using the method of double integration.
• Torsion theory: Torsion of beams of circular cross-section and cross-section of circular ring. Torsion of beams with rectangular cross-section.
• Buckling of rods and columns. Combined stress of a beam with axial and transverse loads. Large deformations of structures subjected to bending, second-order phenomena.
• Applications of deformation compatibility conditions.
• Material failure: Density theory of the rotational energy of deformations (Mises), maximum shear stress theory (Tresca), internal friction theory (Mohr - Coulomb).
• Cyclic loads. Material fatigue.
• Creep and relaxation of materials.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning*	**Activity** / **Semester workload** Lectures / 52 Individual study / 78

activity are given as well as the hours of non-directed study according to the principles of the ECTS	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.	

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R. L. Mott, «Applied Strength of Materials», CRC Press, 2015.
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Beer F. - Johnston R. - DeWolf J. - Mazurek D., «Mechanics of Materials», Tziolas, 2015.

14.4.2. Fluid Mechanics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ002	**SEMESTER**	4th
COURSE TITLE	Fluid Mechanics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes

COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to recognize the basic rules governing fluid mechanics, hydrostatics, fluid flow and energy euations.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information _Decision-making _Working independently _Respect for the natural environment _Production of free, creative and inductive thinking.

SYLLABUS

- Basic properties of fludis.
- Hydrostatics.
- Flow dynamics..
- Navier-Stokes euations.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails,

	etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of Evaluation: Greek. Written test with extended answer questions (formative and/or inferential). Theory assessment (90% of the final grade): • A written progress examination (30% of the final grade) including: _Theoretical Extended Response Questions (formative and/or inferential) _Problem-solving exercises. • Written final examination (60% of the final grade) including: _Theoretical extended response questions (formative and/or inferential) _Problem-solving exercises. Laboratory assessment (10% of the final grade): • Written assignment on laboratory exercises. The present course description with the assessment criteria is accessible to students in the Departmental study guide (Departmental website) and on the course website. The outline is communicated orally to students during the first lecture.

Activity	***Semester workload***
Lectures	32
Practice/exercises	10
Practice/exercises	10
Project(s)	10
Individual study	68
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

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• [in Greek} Λιακόπουλος Αντώνης, Μηχανική Ρευστών, Εκδόσεις Τζιόλα, 2019 (2η έκδοση), ISBN: 978- 960-418-774-4, Κωδικός Βιβλίου στον Εύδοξο: 77107657
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• [in Greek} Αυλωνίτης Δημήτρης, Αυλωνίτης Σταμάτης, ΜΗΧΑΝΙΚΗ ΡΕΥΣΤΩΝ Ι, Εκδόσεις Τσότρας, 2020 (5η έκδοση), ISBN: 978-618-5309-95-4, Κωδικός Βιβλίου στον Εύδοξο: 94645124
• [in Greek] Παπαϊωάννου Άγγελος, Μηχανική των Ρευστών, Εκδόσεις Σοφία, 2019 (3η έκδοση), ISBN: 978-960-633-004-9, Κωδικός Βιβλίου στον Εύδοξο: 86055189

14.4.3. Structural Analysis I – Determinate structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ012	**SEMESTER**	4th
COURSE TITLE	Structural Analysis I – Determinate structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://elearning.teicm.gr/course/view.php?id=504

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Understand equilibrium and the behavior of determinate structures. Analyze statically determinate structures, such as Beams, Frames, Trusses, Mixed Structures, Continuous Frames and strengthened Structures subject to various permanent loadings. Draw bending, shear and axial force diagrams of determinate structures. Understand and apply the principle of virtual work.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*

Working in an interdisciplinary environment *Production of new research ideas*	*……* *Others…* *…….*

-Search for, analysis and synthesis of data and information, with the use of the necessary technology
-Adapting to new situations
-Decision-making
-Working independently
-Team work
-Working in an interdisciplinary environment
-Project planning and management
-Criticism and self-criticism
-Production of free, creative and inductive thinking

SYLLABUS

2D structures. Internal forces, fundamental and composite structural systems. Simply supported Beams and Frames. Three-hinged arches. Trusses and suspended systems. Influence lines. Extreme values – Envelopes. Energy principles. Calculation of displacements. 3D structures.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Formative evaluation consisted of: 1.Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b .Solving of problems-exercises (70% of final mark)

Activity	*Semester workload*
Lectures	40
Practice/exercises	12
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

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Chapman and Hall publication.
Valiasis Th. (1997), Statics of Linear Structures, Thessaloniki: Ziti publication (in Greek).
W.Wagner and G. Erlhog (2012), Applied Statics, ΚΛΕΙΔΑΡΙΘΜΟΣ publication (Greek translation from German).

14.4.4. Soil mechanics I

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΓΕΩ002		**SEMESTER**	4th
COURSE TITLE	Soil mechanics I			

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=427

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is to help the student understand the basic principles of Soil Mechanics, to consolidate knowledge regarding the behavior of the “soil” as a civil engineering material and to develop the ability to computationally address basic problems in classic applications of Soil Mechanics. Upon successful completion of the course, the student will be able to:
• Recognize, comprehend and be able to classify the basic physical and mechanical properties of soil.
• Distinguish and understand the parameters related to soil behavior.
• Calculate the stresses developing in the soil deposit due to the weight of the soil itself as well as due to external loading, and also estimate the soil shear strength and the stability of soil slopes.
• Combine individual soil characteristics and be able to differentiate and adapt the assessment and

computation procedures based on the particular parameters of each case under consideration.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills:

- Search, analysis and synthesis of data and information
- Decision-making
- Working independently
- Project planning

SYLLABUS

Description of the fundamental principles of soil behavior and introduction to the topics of soil stresses, soil deformations, and soil stability. Introduction to theoretical Soil Mechanics concepts aimed at using appropriate soil parameters for each type of problem.

Content of theory lectures:

- Physical and mechanical properties of soils.
- Laboratory measurements and field tests.
- Water flow in porous soils and its effect on he mechanical behavior of the soil.
- Soil stresses and deformations.
- Shear strength of soil.
- Stability of soil slopes.

Content of laboratory exercises:

- Introduction to issues related to the control and testing of the physical and mechanical soil properties.
- Laboratory determination of soil moisture content.
- Laboratory determination of soil specific weight and unit weight.
- Particle size analysis of soil.
- Laboratory determination of Atterberg limits (liquid limit, plastic limit, shrinkage limit).
- Soil Proctor compaction test.
- Determination of soil density.
- Unconfined compression test (determination of soil uniaxial compression strength).
- Direct shear test (determination of soil shear strength).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students

	(online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Practice/exercises</td><td>26</td></tr><tr><td>Project(s)</td><td>30</td></tr><tr><td>Individual study</td><td>48</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***130***</td></tr></table>
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam that includes: • Theoretical judgment questions on course subjects (short answer questions and multiple-choice questions). • Solving of theory problems-exercises. • Solving of laboratory exercises. Submission of assignments and oral examination that includes: • Laboratory exercises solving. • Solving of theory problems-exercises. • Examination of understanding of course basic concepts.

ATTACHED BIBLIOGRAPHY

- **[In Greek] Barnes G.E. (2014), "Εδαφομηχανική: Αρχές και Εφαρμογές (3η έκδοση)", Εκδόσεις Κλειδάριθμος, Αθήνα, ISBN: 978-960-461-578-0**
- **[In Greek] Καββαδάς Μ. (2016), "Στοιχεία Εδαφομηχανικής (2η έκδοση)", Εκδόσεις Τσότρας, ISBN: 978-618-5066-62-8**
- **[In Greek] Κολέτσος Κ., (2004), "Γεωτεχνική Μηχανική", Εκδόσεις University Studio Press, ISBN: 978-960-12-1256-2**
- **[In Greek] Γραμματικόπουλος Ι., Ανδρεάδου-Μάνου Ν., Χατζηγώγος Θ. (2015), "Εδαφομηχανική: ασκήσεις και προβλήματα (2η έκδοση)", Αφοι Κυριακίδη, Θεσσαλονίκη, ISBN: 978-618- 5105-87-7**
- **[In Greek] Χρηστάρας Β., Χατζηαγγέλου Μ. (2011), "Απλά βήματα στην Εδαφομηχανική", University Studio Press, Θεσσαλονίκη, ISBN: 978-960-12-1935-6**
- **[In Greek] Budhu M. (2020), "Εδαφομηχανική και Θεμελιώσεις", Εκδόσεις Gotsis, Πάτρα, ISBN: 978-960-9427-90-6**
- **Das B.M. (2019), "Advanced Soil Mechanics" , Taylor and Francis (5th edition), New York.**
- **Verruijt A. (2018), "An Introduction to Soil Mechanics", Springer.**

14.4.5. Numerical Analysis

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ008	**SEMESTER**	4th

COURSE TITLE	Numerical Analysis	
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://teachers.teicm.gr/vozikis/NumericalAnalysis/index.html

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to recognize the importance of algorithm usage and be able to assess the reliability of their results, understand the utility of numerical methods as fundamental components of design programs and scientific computations, apply numerical methods to compute solutions for large linear systems, find roots of nonlinear equations, calculate areas of complex regions and solve simple differential equations.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Working independently
- Production of free, creative and inductive thinking

SYLLABUS

The course deals with basic methods of Numerical Analysis that are analyzed and applied using the Matlab software. Topics covered include solving nonlinear equations and linear/nonlinear systems, interpolation, numerical differentiation, numerical computation of definite integrals, solving differential equations, and solving systems of differential equations. Additionally, the application of these methods to problems in Civil Engineering is studied. In the laboratory part of the course, the methods presented in the theoretical lectures are applied using the Matlab (Octave) software on a computer.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The course is taght in a computer cluster room with Matlab/(Octave clone) and open source GNU
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination - open-ended questions (30-40%) - problem - solving questions (70-60%)

Activity	***Semester workload***
Lectures	26
Practice/exercises	13
Practice/exercises	13
Project(s)	16
Individual study	62
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek]. Παπαϊωάννου Σ., Βοζίκης Χ. 'Εισαγωγή στην Αριθμητική Ανάλυση', Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", 2016, ISBN:978-960-603-379-7
-[In Greek]. Σαρρής Ι., Καρακασίδης Θ., Αριθμητικές Μέθοδοι και Εφαρμογές για Μηχανικούς, Εκδόσεις Τζιόλα, 2015, ISBN: 978-969-418-520-7
-[In Greek]. Chapra S., Canale R., Αριθμητικές Μέθοδοι για Μηχανικούς, Εκδόσεις Τζιόλα, 2016, ISBN: 978-960-418-542-9

14.4.6. Reinforced Concrete I

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ010		**SEMESTER**	4th
COURSE TITLE	Reinforced Concrete I			

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=192 http://panagop.civil.ihu.gr/?page_id=29

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:
1. Understand the properties and mechanical behavior of materials (concrete, steel).
2. Identify the limit states used in structural design and apply appropriate combinations of actions.
3. Design linear reinforced concrete members (beams, columns) in the ultimate limit state for normal stress (bending with axial force).
4. Design linear reinforced concrete members (beams, columns) in the ultimate limit state for shear.
5. Apply reinforcement and detailing rules for linear structural elements in accordance with the current regulations.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Historical overview of the use of reinforced concrete (R/C) as a building material and the regulatory provisions that prescribe its application. Introduction to the individual materials of reinforced concrete and their properties
• Design loads. Presentation of the limit state method
• Structural design of building elements (reinforcement covers, anchorages, laps, etc.)
• Introduction to the dimensioning of structural elements for normal stress values
• Dimensioning of reinforced concrete beams in bending and shear
• Dimensioning of reinforced concrete columns in uniaxial and biaxial bending
• Dimensioning of beams in shear

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught (30%). 2. Final written exam (in Greek) at the end of the semester (70%).

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58
Course total (26 hours workload per ECTS credit)	***130***

choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

ATTACHED BIBLIOGRAPHY

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Tsonos A.D., Design of Reinforced Concrete Structures I, Sofia publ., 2017 (in Greek)

Penelis G., Stylianidis K., Kappos A., Ignatakis Ch., Design of Reinforced Concrete Structures According to the New Concrete and Seismic Codes, AUTh publ., 1995 (in Greek)

Georgopoulos Th., Reinforced Concrete I, Georgopoulos publ., 2015 (in Greek)

5th Semester Courses

14.5.1. Hydraulics

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	YΔP003		**SEMESTER**	5th
COURSE TITLE	Hydraulics			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to recognize the basic rules governing hydraulic flow in civil engineering systems related to water distribution in open channels and closed pipes.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
	Showing social, professional and ethical responsibility and

Working independently *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Decision-making
_Working independently
_Respect for the natural environment
_Production of free, creative and inductive thinking.

SYLLABUS

Description of the fundamental principles of water behavior and introduction to the topics of flow in open channels and closed pipes. Introduction to methods for the hydraulic analysis and design of water networks

Content of theory lectures:
- Physical and mechanical properties of soils.
- Laboratory measurements and field tests.
- Water flow in porous soils and its effect on he mechanical behavior of the soil.
- Soil stresses and deformations.
- Shear strength of soil.
- Stability of soil slopes.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	See table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple*	Language of Evaluation: Greek. Written test with extended answer questions (formative and/or inferential). Theory assessment (90% of the final grade):

Activity	***Semester workload***
Lectures	32
Practice/exercises	10
Practice/exercises	10
Project(s)	10
Individual study	68
Course total (26 hours workload per ECTS credit)	***130***

choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	• A written progress examination (30% of the final grade) including: _Theoretical Extended Response Questions (formative and/or inferential) _Problem-solving exercises. • Written final examination (60% of the final grade) including: _Theoretical extended response questions (formative and/or inferential) _Problem-solving exercises. Laboratory assessment (10% of the final grade): • Written assignment on laboratory exercises. The present course description with the assessment criteria is accessible to students in the Departmental study guide (Departmental website) and on the course website. The outline is communicated orally to students during the first lecture.

ATTACHED BIBLIOGRAPHY

• [In Greek] Πρίνος Παναγιώτης, Υδραυλική Κλειστών και Ανοικτών Αγωγών, Εκδόσεις Ζήτη, 2013, ISBN: 978-960-456-344-9. Κωδικός Βιβλίου στον Εύδοξο: 22767973

• [In Greek] Λιακόπουλος Αντώνης, Υδραυλική, Εκδόσεις ΤΖΙΟΛΑ, 2020 (3η έκδοση), ISBN: 978-960-418- 775-1. Κωδικός Βιβλίου στον Εύδοξο: 77107649

• [In Greek] Στάμου Αναστάσιος, Εφαρμοσμένη Υδραυλική, Εκδόσεις Παπασωτηρίου, 2016 (3η έκδοση), ISBN: 978-960-491-109-7. Κωδικός Βιβλίου στον Εύδοξο: 59397206

• [In Greek] Σούλης Ιωάννης, ΥΔΡΑΥΛΙΚΗ, Εκδόσεις ΧΑΡΑΛΑΜΠΟΣ ΝΙΚ. ΑΪΒΑΖΗΣ, 2012, ISBN: 978-960- 549-001-0. Κωδικός Βιβλίου στον Εύδοξο: 22714197

• [In Greek] Δημητρακόπουλος Αλέξανδρος, ΣΤΟΙΧΕΙΑ ΥΔΡΑΥΛΙΚΗΣ ΚΛΕΙΣΤΩΝ ΚΑΙ ΑΝΟΙΚΤΩΝ ΑΓΩΓΩΝ, Εκδόσεις GOTSIS, 2018, ISBN: 978-960-9427-72-2. Κωδικός Βιβλίου στον Εύδοξο: 77119353

14.5.2. Urban planning, urban space implementation of building regulations

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ011	**SEMESTER**	5th
COURSE TITLE	Urban planning, urban space implementation of building regulations		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	

LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=739

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to: • Recognize and define Urban Planning and Urban Design concepts - Understand and use of the relevant terminology – Analyze small urban areas. • Understand the purpose of and be able to apply basic Building Regulations connected to Urban Planning and the urban space formation and production in the contemporary Greek city. • Design (preliminary level – scale 1:100) an urban apartment building of medium architectural complexity, in accordance with the implementation of Regulations: real time data regarding legislation and the site. Also, optimize the configuration of the uncovered area at ground floor level, with a focus on neighborhood sustainability issues. • Evaluate buildings' and urban areas' problems connected with the implementation (or poor implementation) of Urban Planning civic rules and legislation. Provide solutions/ improvement proposals that give incentives for the sustainability of small urban areas and the Greek city. • Participate in urban planning upgrading task-groups of engineers, aiming at rehabilitating existing parts of the city.

General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Working independently _Team work _Working in an interdisciplinary environment _Project planning and management _Respect for difference and multiculturalism _Respect for the natural environment _Criticism and self-criticism _Production of free, creative and inductive thinking	

SYLLABUS

The course introduces students to basic concepts of Urban Planning, focusing on the scale of urban space and the objectives of Urban Design. This point of view is also enhanced with aspects of the relevant legislation, as an attempt to connect the public space of the Greek city (form, function, development) with regulations that determine its production in recent decades. Urban phenomena are examined on the basis of sustainability, starting macroscopically and gradually approaching the scale of urban units and buildings.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td colspan="2">Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td colspan="2">Powerpoint presentations, E-learning platform for educational material.</td></tr>
<tr><td rowspan="11">TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td></td></tr>
<tr><td>Practice/exercises</td><td></td></tr>
<tr><td>Project(s)</td><td></td></tr>
<tr><td>Individual study</td><td></td></tr>
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<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td colspan="2">The evaluation of the students is made up of the following:
A. Performance in final written exam: 50% of the final grade,
B. Quality of exercises, assignments, and design projects (developed during the semester): 40% of the final grade,
C. Participation in the course procedures (i.e. oral participation, meeting deadlines for handing in written work): 10% of the final grade.
The evaluation criteria are listed in the introductory handout of the course, which is posted on the e-learning platform in the beginning of the semester and is also distributed and presented to the students during the 1st class meeting.</td></tr>
</table>

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14.5.3. Highway Engineering I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ004	**SEMESTER**	5th
COURSE TITLE	Highway Engineering I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=743

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to recognize basic principles of geometric design of roads, familiarize with road design guidelines and standards, to analyze, judge and synthesize different criteria of road design and to implement all the above through relative applications.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
	Showing social, professional and ethical responsibility and

Working independently *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Working independently
_Project planning and management
_Respect for the natural environment.

SYLLABUS

Course presentations: • Introduction. Design and construction of road projects. • Regulations. Design procedure and methodology. • Basic concepts and definitions. • Road safety by design (criteria). • Start of road design. • Horizontal alignment. • Vertical alignment. Super elevation diagrams. • Cross sections. • Road widening study. • Visibility study

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	See table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	52
Project(s)	26
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek] Αποστολέρης, Α.Κ. (2015). Οδοποιία Ι – Χαράξεις και Υπολογισμός Χωματισμός, Θεωρία και Πρακτική. Αναστάσιος Κ. Αποστολέρης, ΑΠΟΣΤΟΛΕΡΗΣ ΚΑΙ ΣΙΑ Ο.Ε., ISBN: 9789609371735.

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- [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 2: Διατομές (ΟΜΟΕ-Δ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
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- [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 4: Κύριες Αστικές Οδοί (ΟΜΟΕ-ΚΑΟ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
- [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 5: Πρόσθετες Λωρίδες Κυκλοφορίας (ΟΜΟΕ-ΠΛΚ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.

14.5.4. Structural Analysis II – Indeterminate structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ014	**SEMESTER**	5th
COURSE TITLE	Structural Analysis II – Indeterminate structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://elearning.teicm.gr/course/view.php?id=228

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*

- *Guidelines for writing Learning Outcomes*

Comprehend the degree of indeterminacy. Analyse statically indeterminate structures. Compute, displacements and rotations. Determine the influence of temperature changes and support movements on structural response

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

-Search for, analysis and synthesis of data and information, with the use of the necessary technology
-Adapting to new situations
-Decision-making
-Working independently
-Team work
-Working in an interdisciplinary environment
-Project planning and management
-Criticism and self-criticism
-Production of free, creative and inductive thinking

SYLLABUS

Introduction to statically indeterminate structures. Differences between statically determinate and indeterminate structures
Deformation Method (Method of Nodal Displacements). Application to plane structures. Symmetry of structures and loading.Support retreat, settlements, elastic supports, thermal loads.
Force Method. Application to plane structures, frames and trusses. Comparison to the Deformation Method
Influence lines of indeterminate structures. Müller-Breslau Principle. Computation of the extreme response values.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*	see table below

Activity	*Semester workload*
Lectures	40
Practice/exercises	12
Individual study	78

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS		
	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Formative evaluation consisted of: 1.Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b .Solving of problems-exercises (70% of final mark)	

ATTACHED BIBLIOGRAPHY

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Hibbeler R.C. (2002), Structural Analysis, Prentice Hall.
W.Wagner and G. Erlhog (2012), Applied Statics, ΚΛΕΙΔΑΡΙΘΜΟΣ publication (Greek translation from German).

14.5.5. Reinforced Concrete II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ013	**SEMESTER**	5th
COURSE TITLE	Reinforced Concrete II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=773

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, students will be able to: 1. Calculate loads and element forces in reinforced concrete slabs and transfer loads from slabs to beams. 2. Recognize the types of slabs and dimension one-way or two-way supported slabs according to Eurocode 2. 3. Dimension linear elements of reinforced concrete in torsion according to Eurocode 2. 4. Model reinforced concrete frame structures using finite element analysis software for appropriate combinations of loads in ultimate and serviceability limit states and calculate the envelopes of element forces 5. Draw the construction plan with the developments and reinforcement details of the reinforced concrete elements.

General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
- Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Working independently - Team work - Working in an interdisciplinary environment - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking	

SYLLABUS

• Reinforced concrete slabs. Types of slabs and design of simply and cross-reinforced slabs. • Load-balancing method. Resolution of slabs using the Czerny tables. • Strip method. Resolution of slabs using the Markus tables. • Design in torsion. • Load combinations for gravity and seismic actions. Alternating loads and stress envelopes. • Dimensioning of linear reinforced concrete elements (beams/columns) for gravity and seismic actions. • Simulation of a reinforced concrete frame in a finite element program. Calculation of stress

envelopes. Dimensioning. • Construction plan. Reinforcement details.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	See table below.

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught (30%). 2. Final written exam (in Greek) at the end of the semester (70%). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

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Zararis P., Reinforced Concrete Calculation Methods, Kyriakidis publ., 2002 (in Greek)

14.5.6. Soil mechanics II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ003	**SEMESTER**	5th
COURSE TITLE	Soil mechanics II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=428

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is to help the student understand the basic principles of Soil Mechanics, to consolidate knowledge regarding the behavior of the “soil” as a civil engineering material and to develop the ability to computationally address basic problems in classic applications of Soil Mechanics. Upon successful completion of the course, the student will be able to:

- Recognize and understand the basic characteristics of the behavior of different types of soils.
- Distinguish and comprehend the parameters related to the bearing capacity of the soil and to the developing settlements in the soil.
- Calculate the bearing capacity of the soil as well as the developing settlements in the case of surface foundations.
- Calculate the horizontal soil stresses and earth pressures.
- Combine the individual soil properties and characteristics and be able to differentiate and adapt estimation and computation procedures based on the particular parameters of each examined case study.
- Synthesize solutions based on the theories that have been taught, evaluating the requirements of the problem at hand, being able to support the proposed solutions, and compare by choosing the most appropriate among different approaches.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
	Respect for difference and multiculturalism
Adapting to new situations	*Respect for the natural environment*
Decision-making	*Showing social, professional and ethical responsibility and*

Working independently *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
• Search, analysis and synthesis of data and information
• Decision-making
• Working independently
• Project planning
• Self awareness excercise

SYLLABUS

Examination of soil behavior as a material involved in Civil Engineering constructions with the aim of solving problems related to soil bearing capacity, developing settlements as well as lateral earth pressures. Content of theory lectures and practical exercises:
• Influence of external loads on developing soil stresses.
• Bearing capacity of soil in shallow foundations.
• Settlements of granular and cohesive soils, soil consolidation.
• Behavior of soils under drained and undrained conditions.
• Earth pressures and retaining structures.
• Introduction to the current regulatory framework (Eurocode 7).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	Written final examination including: • Short answer and Multiple Choice Theoretical Questions (Formative and/or Inferential) • Solving problems-exercises Written assignments and oral examination including: • Solving problems-exercises • Assessment of knowledge on basic subjects of the course

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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• [In Greek] Γεωργιάδης Κ., Γεωργιάδης Μ. (2009), "Στοιχεία Εδαφομηχανικής", Εκδόσεις ΖΗΤΗ, Θεσσαλονίκη, ISBN: 978-960-456-157-5

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• Das B.M. (2019), "Advanced Soil Mechanics", Taylor and Francis (5th edition), New York.

• Verruijt A. (2018), "An Introduction to Soil Mechanics", Springer

• [In Greek] Budhu M. (2020), "Εδαφομηχανική και Θεμελιώσεις", Εκδόσεις Gotsis, Πάτρα, ISBN: 978- 960-9427-90-6

6th Semester Courses

14.6.1. Steel Structures I

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ016		**SEMESTER**	6th
COURSE TITLE	Steel Structures I			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**		**CREDITS**
		4		4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=863			

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon the successful completion of the course the students are anticipated to: - Understand the load resisting mechanisms in typical steel structures; - Understand and analyse the mechanical behaviour of beam-type steel members; - Identify possible failure mechanisms; - Check and design steel members according to the Eurocode 3 provisions.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim? *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
- Search, analysis and synthesis of information and data using the appropriate technology - Decision making - Student individual project - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking

SYLLABUS

Structural steel: mechanical properties and typical structural applications. Structural analysis and Eurocode 3 provisions for the design of steel structures. Load combinations. Ultimate and serviceability limit states. Local buckling and cross-section classification. Resistance of steel cross-sections and steel members under tension, compression, bending, shear and combined action effects. Buckling resistance of steel members. Flexural and lateral-torsional buckling. Structural layouts and load resisting mechanisms of typical steel structures.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public*	Formative evaluation consisting of: - Non-compulsory homework exercises focusing on problem solving - Final written exams comprising problem-solving questions

Activity	*Semester workload*
Lectures	42
Individual study	62
Course total (26 hours workload per ECTS credit)	***104***

presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- Vayas, I., Ermopoulos, J., Ioannidis, G. 2005. Design of steel structures – According to the final version of Eurocodes. Publisher: Κλειδάριθμος, ISBN: 978-960-461-582-7 (in Greek)
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- Giannopoulos A.C. Metal structures, 2005. Publisher: Gotsis, ISBN:9789604115259 (in Greek)

14.6.2. Foundations Retaining Walls

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ004	**SEMESTER**	6th
COURSE TITLE	Foundations Retaining Walls		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=711

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is to help the student understand the theoretical principles in the subjects of Foundations and Retaining Structures and the ability to computationally address basic problems in classic applications of Foundations. Upon successful completion of the course, the student will be able to:

• Recognize, understand and evaluate the basic physical and mechanical parameters of soil and construction related to the study and analysis of foundations and retaining walls.

• Distinguish and understand the different foundation cases, as well as the type and behavior of retaining structures.

• Study a single shallow foundation by investigating in detail, based on the existing regulatory framework, the required failure checks in bearing capacity, settlements, overturning, sliding, uplift, bending, shearing and punching. Also, calculate the required reinforcement (foundation detailing).

• Estimate the developing forces and design the foundation tie-beams.

• Calculate bearing capacity of piles and pile settlement.

• Calculate the earth pressures and design a retaining wall.

• Synthesize solutions based on the course contents, evaluating the requirements of the problem at hand, support the proposed solutions and compare and choose the most suitable between different approaches.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

• Search, analysis and synthesis of information and data
• Decision making
• Working independently
• Project planning

SYLLABUS

Study, analysis and design of various types of foundations (reinforced concrete shallow and deep foundations) and retaining walls. It includes the computation of internal forces, the calculation of the loading at foundation level and the required procedure to determine the reinforcement and configuration of the examined structural elements based on the current code regulations.

Content of theory lectures and practical exercises:

• Relation to Soil Mechanics (soil characteristics, soil stresses, soil bearing capacity and settlements, based on literature formulas and code regulations).

• Study of shallow foundations and theoretical application in the design of surface footings. Detailed application to individual footings including the description of design rules, footing stability checks (overturning, sliding, uplift), foundation soil bearing capacity and settlement checks, and design of concrete footings (in bending, shearing, punching) including calculation of required reinforcement.

- Study and design of foundation tie-beams.
- Study of bearing capacity and settlement of pile foundations (individual piles and pile group).
- Study and design of reinforced concrete retaining walls.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignments (submitted in stages) and oral examination including: • Processing and solving exercises-problems of foundations and retaining walls • Assessment of understanding of key concepts of the course

Teaching methods:

Activity	*Semester workload*
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek] Αναγνωστόπουλος Χ., Χατζηγώγος Θ., Αναστασιάδης Α., Πιτιλάκης Δ. (2012), "Θεμελιώσεις-Αντιστηρίξεις και Γεωτεχνικά Έργα", Εκδόσεις Αϊβάζης, Θεσσαλονίκη, ISBN: 978-960-549- 000-3
- [In Greek] Γεωργιάδης Κ., Γεωργιάδης Μ. (2009), "Στοιχεία Εδαφομηχανικής", Εκδόσεις ΖΗΤΗ, Θεσσαλονίκη, ISBN: 978-960-456-157-5
- [In Greek] Αναγνωστόπουλος Α., Παπαδόπουλος Β., (2019), "Σχεδιασμός των Θεμελιώσεων", Εκδόσεις Συμεών, ISBN: 978-960-9400-50-3
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- [In Greek] Αναγνωστόπουλος Α., Καββαδάς Μ., Παπαδόπουλος Β. (2009), "Σημειώσεις για τον Ευρωκώδικα 7 (EN 1997)", Τεχνικό Επιμελητήριο Ελλάδος, Αθήνα
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Πανεπιστημιακές Εκδόσεις
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• [In Greek] Barnes G.E. (2014), "Εδαφομηχανική: Αρχές και Εφαρμογές (3η έκδοση)", Εκδόσεις Κλειδάριθμος, Αθήνα, ISBN: 978-960-461-578-0
• [In Greek] Κωστόπουλος Σ.Δ. (2008), "Γεωτεχνικές Κατασκευές Ι (2η έκδοση)", Εκδόσεις Ίων, ISBN: 960- 411-563-4
• [In Greek] Bowles J.E. (2009), "Θεμελιώσεις: Τόμος Ι", Εκδόσεις Φούντας, Αθήνα, ISBN:978960330665-8
• [In Greek] Πενέλης Γ., Στυλιανίδης Κ., Κάππος Α., Ιγνατάκης Χ. (2008), "Κατασκευές από Οπλισμένο Σκυρόδεμα σύμφωνα με τους Νέους Κανονισμούς Ο/Σ (2η έκδοση)", Εκδόσεις Αϊβάζης, Θεσσαλονίκη, ISBN: 978-960-86090-9-9

14.6.3. Highway Engineering II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ005	**SEMESTER**	6th
COURSE TITLE	Highway Engineering II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=744

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to recognize the construction procedure of road projects, earthworks calculation, road drainage, construction procedures of flexible pavements, rigid pavements, pavement maintenance and rehabilitation, and pavement management and recycling.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
-Search for, analysis and synthesis of data and information, with the use of the necessary technology -Adapting to new situations -Decision-making -Project planning and management _Respect for the natural environment

SYLLABUS

Road construction, earthworks and engineering projects, geological and geotechnical investigation of road design, soils: origin and physical properties, construction equipment and execution of earthworks, cuttings, embankments, geosynthtetic materials in road engineering, landslides and slope stability, cut and cover method, reinforced embankments, road drainage works, culverts, environmental impacts of road construction, road earthworks, earthworks management, flexible pavement layers, flexible pavements design methods, rigid pavements, pavement maintenance and rehabilitation, pavement management, pavement recycling.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	52
Course total (26 hours workload per ECTS credit)	***104***

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- [In Greek] Αποστολέρης, Α.Κ. (2015). Οδοποιία Ι – Χαράξεις και Υπολογισμός Χωματισμός, Θεωρία και Πρακτική. Αναστάσιος Κ. Αποστολέρης, ΑΠΟΣΤΟΛΕΡΗΣ ΚΑΙ ΣΙΑ Ο.Ε., ISBN: 9789609371735.
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- [In Greek] Νικολαΐδης, Αθ. Φ. (2019). Οδοποιία: Οδοστρώματα - Υλικά - Έλεγχος Ποιότητας. ΙΚΑΝΙΚ Ι.Κ.Ε., ISBN: 978-618-84166-0-4.
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- [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 3: Χαράξεις (ΟΜΟΕ-Χ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
- [In Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 8: Αποχέτευση - Στράγγιση - Υδραυλικά Έργα Οδών (ΟΜΟΕ-ΑΣΥΕΟ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 2/11/2002.

14.6.4. Dynamics of Structures I

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ015	**SEMESTER**	6th
COURSE TITLE	Dynamics of Structures I		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will*

acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Understand how structures respond to dynamic loads. Evaluate the critical parameters that affect the structural dynamic response. Construct and solve (analytically and/or computationally) the equation of motions for sdof and mdof systems. Interpret and use earthquake response and design spectra.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

-Search for, analysis and synthesis of data and information, with the use of the necessary technology
-Adapting to new situations
-Decision-making
-Working independently
-Team work
-Working in an interdisciplinary environment
-Project planning and management
-Criticism and self-criticism
-Production of free, creative and inductive thinking

SYLLABUS

Differences between static and dynamic response of structures. Dynamic loads. Degrees of freedom. Formulation of equation of motion.
Systems with one degree of freedom (sdof):
Free undamped and damped vibrations. Forced vibrations under harmonic and impulsive forces. Forced undamped and damped vibrations for any external load. Duhamel integral.
Response under ground motion. Numerical calculation of dynamic response.Response spectra.
Systems with many degrees of freedom (mdof):
Formulation of mass and stiffness matrices. Free vibration. Eigenfrequencieses and modeal shapes. Orthogonality properties.
Forced vibations. Generalized mass, stiffness, external force. Decoupling techniques for the evaluation of dynamic response.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.

TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	*Activity*	*Semester workload*
	Lectures	40
	Practice/exercises	12
	Individual study	78
	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Formative evaluation consisted of: 1.Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b .Solving of problems-exercises (70% of final mark)	

ATTACHED BIBLIOGRAPHY

A.Chopra (2016), Dynamics of Structures, Prentice-hall International Series

14.6.5. Project Management and Construction Site Management

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ006	**SEMESTER**	6th
COURSE TITLE	Project Management and Construction Site Management		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to cite methods of economic investment evaluation, layout the organizational structure of a project, prepare project safety plans, analyze, describe and graphically depict the project's organizational structure and provide cost estimates (takeoffs) as well as activity duration estimates and finally create project time schedules as well as risk management plans.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Project planning and management
- Decision-making

SYLLABUS

Introduction to project management. Methods of project management and control. Methods of network analysis. Production resource scheduling. Cost estimation of projects and financial planning. Project control. Quality management. Health and safety management in projects.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, E-learning platform for educational material.

TEACHING METHODS *The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity***	***Semester workload***
	Lectures	39
	Practice/exercises	13
	Project(s)	52
	Course total (26 hours workload per ECTS credit)	***104***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination (100%) or Final written examination (70%) optional assignement (30%).	

ATTACHED BIBLIOGRAPHY

[In Greek]. Πολύζος, Σ. (2004) Διοίκηση Διαχείριση των Έργων - Μέθοδοι και Τεχνικές, Κριτική, ISBN: 960-218-379-9.
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[In Greek]. Δημητριάδης, Αντώνης. 2004. Διοίκηση, διαχείριση έργου – Project management. 3η έκδοση. Αθήνα: Εκδόσεις Νέων Τεχνολογιών.

14.6.6. Underground Hydraulic and Hydrology

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ005	**SEMESTER**	6th
COURSE TITLE	Underground Hydraulic and Hydrology		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		
COURSE TYPE *general background, special background, specialised general*	Scientific Background	

knowledge, skills development	
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
The successful completion of the course will enable students to: - Clarify the laws of hydraulics linked with the saturated water flow in the ground; - Interpret the hydrological cycle and natural hydrological processes; - Define the spatial and temporal rainfall distribution at catchments' scale; - Analyze groundwater flows towards ditches and wells from confined and unconfined aquifers; - Apply approximate solutions for flow in saturated porous medium; - Evaluate the required technical works required for hydrological studies' development.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
-Search for, analysis and synthesis of data and information, with the use of the necessary technology -Adapting to new situations -Decision-making -Working independently -Team work -Working in an interdisciplinary environment -Project planning and management -Criticism and self-criticism -Production of free, creative and inductive thinking

SYLLABUS

- Basic properties and classification of aquifers and hydraulic parameters. Soil characteristics. Darcy's law. Coefficient of permeability

- Continuity equation. The mathematical model of groundwater flows. Types of boundaries and boundary conditions - Confined and free surface flows towards ditches and wells - Systems of wells. Method of images. Seepage force and the effect of piping - Hydrologic cycle, hydrological processes and water balances - Spatial and temporal rainfall distribution at catchments' scale - Measurements and analysis of rainfall and stream discharges - Prevision of floods and droughts. Simulation of watersheds - Estimation of hydrologic data for engineering works

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Educational visit	
Individual study	
Course total (26 hours workload per ECTS credit)	***104***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Formative evaluation consisted of: - Non-compulsory intermediate essays (5 to 6 in total) (30% of final mark) focused on solving problems : - Final written exams (70% of final mark) consisted of: a) multiple choice and short answer questions on the basic theory of the course (10% of the final mark) b) Solving of problems/questions (60% of the final mark)

ATTACHED BIBLIOGRAPHY

- Κουτσογιάννης Δημήτριος, Ξανθόπουλος Θεμιστοκλής, Τεχνική Υδρολογία, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", ISBN: 978-960-603-506-7. Κωδικός Βιβλίου στον Εύδοξο: 59390290
- Τολίκας Δημήτρης Κ., Υπόγεια υδραυλική, Εκδόσεις Επίκεντρο, 2005 (1η έκδοση), ISBN: 978-960-88731-7-9. Κωδικός Βιβλίου στον Εύδοξο: 15196
- Λατινόπουλος Περικλής, ΥΔΡΑΥΛΙΚΗ ΤΩΝ ΥΠΟΓΕΙΩΝ ΡΟΩΝ, Εκδόσεις ΧΑΡΙΣ ΕΠΕ, 2006 (1η έκδοση), ISBN: 978-960-98154-5-1. Κωδικός Βιβλίου στον Εύδοξο: 6861
- Τσακίρης Γ., Υδατικοί πόροι : Ι Τεχνική υδρολογία και διαχείρηση των υδατικών πόρων, Εκδόσεις ΣΥΜΜΕΤΡΙΑ, 2012 (1η έκδοση), ISBN: 978-960-266-380-6 Κωδικός Βιβλίου στον Εύδοξο: 22771790
- Τσακίρης Γ., Υδατικοί Πόροι ΙΙ: Εφαρμογές Τεχνικής Υδρολογίας, Εκδόσεις Συμμετρία, 2009 (1η έκδοση),

ISBN: 978-960-266-266-3 Κωδικός Βιβλίου στον Εύδοξο: 45490
- Μπαλτάς Ευάγγελος, Μιμίκου Μαρία, Τεχνική Υδρολογία, Εκδόσεις Παπασωτηρίου, 2018 (6η έκδοση), ISBN: 978-960-491-125-7. Κωδικός Βιβλίου στον Εύδοξο: 77117411
- Μυρωνίδης Δημήτριος, Υδρολογία και Υδραυλική, Εκδόσεις ΤΖΙΟΛΑ, 2021 (1η έκδοση), ISBN: 978-960-418-884-0. Κωδικός Βιβλίου στον Εύδοξο: 94688988

14.6.7. Water Supply and Sewerage Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ004	**SEMESTER**	6th
COURSE TITLE	Water Supply and Sewerage Systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.
Consult Appendix A
- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of this course, students will be able to:
- identify and describe qualitative and quantitative water and sewerage (wastewater and stormwater) data
- explain and estimate the required water supply and sewerage infrastructure in horizontal and vertical sections
- examine the design of typical water supply projects (external aqueducts, reservoirs, distribution networks)

- design sewage and stormwater drainage networks in an urban environment
- asses hydraulic network analysis models on the computer
- identify water supply and sewerage works in the relevant studies (technical report, general works layout, pipeline sections, materials, geometric features).

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search, analysis and synthesis of data and information
- Adapting to new situations
- Decision making
- Individual work
- Working in an interdisciplinary environment
- Project design and management
- Criticism
- Promoting free, creative and inductive thinking

SYLLABUS

1. Short course description:

The course aims to provide students with the basic theoretical and background knowledge for the core course 'YDR004 Water Supply and Sewerage Systems'. It includes the necessary material for the understanding of the basic concepts of design and dimensioning of all individual water supply and sewerage network projects in urban and semi-urban areas through a theoretical and practical (application exercises) approach.

2. Lectures' content:

o Introduction to urban hydraulic works, historical background. Basic principles and design parameters of water supply projects.
o Qualitative and quantitative water quality and quantity data. Sampling of springs, surface and groundwater.
o Pumping stations and pressure mains. Calculation of water needs.
o Siting, sizing, and design of water reservoirs and yield/reduction wells. Required elevation and sizing.
o Design, hydraulic analysis and sizing of distribution networks. Calculation of radial and axial networks.
o Computer models for solving water supply networks.
o Qualitative and quantitative data of municipal/ industrial wastewater and stormwater.
o Hydraulics of sewers.
o Basic principles and design parameters of urban sewerage projects. Types of drainage and stormwater networks.
o Principles of sewage network design. Flow speed limits. Minimum gradients. Couplings. Local losses. High and low velocity problems. Qualitative and technological aspects of sewerage pipelines.
o Estimation of stormwater flows. Design principles for rainwater collection networks. Methodology for the design and calculation of rainwater networks in horizontal and vertical sections. Construction and hydrological constraints.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Support of the learning process (Teaching and Communication with students) through PowerPoint lectures, through the course website, through the e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites and scientific articles) posted on the e-learning page. Teacher-student collaboration time either by physical presence or by teleconference.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>40</td></tr>
<tr><td>Practice/exercises</td><td>12</td></tr>
<tr><td>Educational visit</td><td></td></tr>
<tr><td>Individual study</td><td>50</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>104</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Language of Evaluation: Greek.
Written test with extended answer questions (formative and/or inferential).
Theory assessment (100% of the final grade):
• A written progress examination (30% of the final grade) including:
_Theoretical Extended Response Questions (formative and/or inferential)
_Problem-solving exercises.
• Written final examination (70% of the final grade) including:
_Theoretical extended response questions (formative and/or inferential
_Problem-solving exercises.
The present course description with the assessment criteria is accessible to students in the Departmental study guide (Departmental website) and on the course website.
The outline is communicated orally to students during the first lecture.</td></tr>
</table>

ATTACHED BIBLIOGRAPHY

- [In Greek] Πρίνος Παναγιώτης, 2013, Υδραυλική Κλειστών και Ανοικτών Αγωγών, Εκδόσεις Ζήτη, ISBN: 978-960-456-344-9. Κωδικός στον Εύδοξο: 2276797.
- [In Greek] Τσακίρης Γεώργιος, 2010, Υδραυλικά Έργα, Σχεδιασμός και Διαχείριση, Τόμος Ι: Αστικά Υδραυλικά Έργα, Εκδόσεις Συμμετρία, ISBN: 978-960-266-289-2. Κωδικός στον Εύδοξο: 45485.
- [In Greek] Λαγγούσης Ανδρέας, Φουρνιώτης Νικόλαος, 2020, ΣΤΟΙΧΕΙΑ ΣΧΕΔΙΑΣΜΟΥ ΕΡΓΩΝ ΥΔΡΕΥΣΗΣ ΚΑΙ ΑΠΟΧΕΤΕΥΣΗΣ, Εκδόσεις GOTSIS, ISBN: 9789609427890. Κωδικός στον Εύδοξο: 94702516.
- [In Greek] Δημητρακόπουλος Αλέξανδρος, 2008, Σχεδιασμός Υδραυλικών Έργων, Εκδόσεις Φ. ΦΩΤΟΠΟΥΛΟΣ

- Α. ΧΑΡΑΛΑΜΠΑΚΗΣ Ο.Ε., ISBN: 978-960-88473-1-6. Κωδικός στον Εύδοξο: 456.
• [In Greek] Στάμου Αναστάσιος, 2016 (3η έκδ.), Εφαρμοσμένη Υδραυλική, Εκδόσεις Παπασωτηρίου, ISBN: 978-960-491-109-7. Κωδικός στον Εύδοξο: 59397206.

7th Semester Courses

14.7.1. Steel Structures II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ017	**SEMESTER**	7th
COURSE TITLE	Steel Structures II		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=945

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon the successful completion of the course the students are anticipated to:
- Understand, analyse and evaluate the mechanical behaviour of typical steel connections;
- Identify the possible failure mechanisms of typical steel connections;
- Analyse, evaluate and design typical connections in steel structures;
- Understand and evaluate the seismic actions that are imposed in steel structures;
- Develop the structural system of typical steel structures (including their connections) for resisting static and seismic actions;
- Understand the consequences of accidental or unexpected actions in steel structures;
- Select appropriate surface protection measures for steel structures.

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search, analysis and synthesis of information and data using the appropriate technology
- Decision making
- Student individual project
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Steel connections with mechanical fasteners (bolts, pins, rivets) and welds. Joints in truss and frame structures (classification, modelling and analysis methods). Design of steel connections in accordance with the provisions of Eurocode 3. Shear and tension connections. Design of steel structures against seismic actions according to the provisions of Eurocode 8. Construction aspects of steel structures. Class 4 cross-sections. Design against corrosion and fire. Overhead crane runway beams.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation,*	Formative evaluation consisting of: - Non-compulsory homework exercises focusing on problem solving - Final written exams comprising problem-solving questions

Activity	*Semester workload*
Lectures	42
Individual study	62
Course total (26 hours workload per ECTS credit)	***104***

other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- Sofianopoulos S.D. 2006. Elements in metal structures. Publisher: Παπασωτηρίου, ISBN: 9789607530745 (in Greek)
- Baniotopoulos, C.K. 2003. Connections of metal structures. Publisher: Ζήτη, ISBN: 9789604318926 (in Greek)

14.7.2. Matrix Structural Analysis

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ004	**SEMESTER**	7th
COURSE TITLE	Matrix Structural Analysis		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Understand the Direct Robustness (Stiffness) Method. Apply the method for the analysis of plane trusses and frames. Apply the method for the analysis of 3D structures.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim? *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
-Search for, analysis and synthesis of data and information, with the use of the necessary technology -Adapting to new situations -Decision-making -Working independently -Team work -Working in an interdisciplinary environment -Project planning and management -Criticism and self-criticism -Production of free, creative and inductive thinking

SYLLABUS

Overview of matrix structural analysis and design. Primary structural members and their modeling. Global and local systems of axes. Global and local systems of axes. Vectors of end-actions and end-translations of a plane truss and a plane frame element. Transformation matrix. Calculation of local-global stiffness matrix of a plane truss and a plane frame element. Analytical and numerical (shape function, deformation matrix) methods. Vectors of nodal-forces and nodal-translations, global stiffness matrix of a plane truss and a plane frame.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION	Formative evaluation consisted of:

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

Description of the evaluation procedure *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1.Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b .Solving of problems-exercises (70% of final mark)

ATTACHED BIBLIOGRAPHY

M.Papadrakakis and E.Sapountzakis (2018), Matrix Methods for Advanced Structural Analysis, Elsevier Inc.

14.7.3. Plates Shells – Special issues in Finite Element Analysis

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔOM020	**SEMESTER**	7th
COURSE TITLE	Plates Shells – Special issues in Finite Element Analysis		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course aims to understand the behavior of plates - shells - disks using analytical and approximate methods and the application of the finite element method to planar structures.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Introduction to the mathematical theory of elasticity. The differential equation of the disc in Cartesian and polar coordinates.
Thin plates. The differential equation of plates. Analytical and approximate solutions. Orthogonal - circular plates.
Introduction to the Finite Element Method. Finite elements of plates (Kirchhoff). Finite elements of plates (Mindlin).
Shells. Loads, physical quantities and equations of shell theory. Shell membrane theory. Shell bending theory.
Modelling of planar structures.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-*	see table below

Activity	***Semester workload***
Lectures	52
Individual study	78

directed study according to the principles of the ECTS	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.	

ATTACHED BIBLIOGRAPHY

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J. Katsikadelis, The Boundary Element Method For Plate Analysis, 2014, Academic press, Elsevier
Tsamasfyros G., Theotokoglou E., Finite Element Method vol. I, Symmetry publ., 2005 (in Greek)
Provatidis Ch., Finite Elements in the Analysis of Structures, Tziolas publ., 2016 (in Greek)

14.7.4. Dynamics of Structures II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ021	**SEMESTER**	7th
COURSE TITLE	Dynamics of Structures II		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr		

LEARNING OUTCOMES

Learning outcomes
Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Determine the dynamic behaviour of complex structural systems (in both time and frequency domains). Understand, model and compute the nonlinear dynamic response of structures exposed to various environmental loads Clarify and evaluate the effect of randomness of environmental loads.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
-Search for, analysis and synthesis of data and information, with the use of the necessary technology -Adapting to new situations -Decision-making -Working independently -Team work -Working in an interdisciplinary environment -Project planning and management -Criticism and self-criticism -Production of free, creative and inductive thinking

SYLLABUS

Generalized sdof systems. Static condensation and Static correction metods. Rayleigh-Ritz methods. Non-classically damped systems. Dynamics of inelastic structure. Earhquake response of base-isolated buildings.
Frequency-domain method of elastic response analysis. Introduction to random vibration.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.
TEACHING METHODS *The manner and methods of teaching are*	***Activity*** | ***Semester workload***

described in detail. *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Lectures: 40 Practice/exercises: 12 Individual study: 78 Course total (26 hours workload per ECTS credit): ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The evaluation of the students is composed of marks collected from different parts of the teaching process, as follows: 1. Individual projects (2-3) during the semester (30% of the final grade) 2. Final written exams (70% of final grade)

ATTACHED BIBLIOGRAPHY

A.Chopra (2016), Dynamics of Structures, Prentice-hall International Series

14.7.5. Building Construction II

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ022	**SEMESTER**	7th
COURSE TITLE	Building Construction II		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**	
	4	5	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO	Yes		

ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to address unique constructional issues and propose solutions for them. They should be able to choose appropriate materials from the available industry and substantiate their choice. They should be able to navigate through a wide range of sources to formulate their proposal, produce the respective constructional drawings and provide for technical specifications, maintaining references to the building's drawings. Finally, they should be able to organize constructional information for the building's construction specifications.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

-Search for, analysis and synthesis of data and information, with the use of the necessary technology
-Adapting to new situations
-Decision-making
-Working independently
-Team work
-Project planning and management
-Respect for the natural environment
-Criticism and self-criticism
-Production of free, creative and inductive thinking

SYLLABUS

This course aims to train students to provide solutions for advanced constructional issues in a building. Special issues in thermal insulation, water protection, acoustic protection, fire-resistance, staircase detailing, special flooring, structural glazing, wall cladding are presented and analyzed. Students learn to use a variety of sources to propose solutions, materials and building specifications. Starting from smaller exercises, they work on a project throughout the semester where all these issues are implemented. Courses are enhanced by visits to construction sites and buildings, where students are also handed out related assignments.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Powerpoint presentations, e-learning platform for educational material</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>25</td></tr>
<tr><td>Practice/exercises</td><td>25</td></tr>
<tr><td>Individual study</td><td>30</td></tr>
<tr><td>Project(s)</td><td>20</td></tr>
<tr><td>Project(s)</td><td>30</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final written examination (50%)
Compulsory assignment/project (50%)</td></tr>
</table>

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-[In Greek]. Αθανασόπουλος Χ., ‘’Κατασκευή κτιρίων: Σύνθεση και Τεχνολογία’’, Αθήνα 1991
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-[In Greek]. Τουλιάτος Π. ‘’Θέματα Οικοδομικής’’, Ε.Μ.Π., εκδόσεις Συμμετρία, Αθήνα, 1999.
-[In Greek]. Τσινίκας Ν., ‘’Αρχιτεκτονική Τεχνολογία’’ εκδ. University Studio Press, Θεσσαλονίκη 1993
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-[In Greek]. Ching, F., Building Construction Illlustrated , Wiley, 5th edition, 2014
-[In Greek]. Schittich, C. Glass Construction Manual, Birkhäuser Architecture; 2nd, revised and expanded ed. Edition, 2007

14.7.6. Design and Retrofitting of Masonry Structures

GENERAL

SCHOOL	Engineering
ACADEMIC UNIT	CIVIL ENGINEERING

LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ019	**SEMESTER**	7th
COURSE TITLE	Design and Retrofitting of Masonry Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:
1. Know the properties of the individual materials (stone blocks and mortar) that make up the load-bearing masonry as well as the mechanical behavior of the composite material
2. Understand the structural system of load-bearing masonry structures and the element forces that develop in it
3. Apply the regulatory provisions of the current codes (Eurocodes 6 and 8) for the design of masonry structures
4. Recognize the typical forms of failure in structural elements and buildings from masonry and to propose/apply appropriate intervention techniques

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*

Production of new research ideas	*Others…* *…….*
- Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Working independently - Team work - Working in an interdisciplinary environment - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking	

SYLLABUS

- The individual materials of load-bearing masonry. Types of bricks and mortars
- The mechanics of load-bearing masonry. Resistance to compression, tension, bending, and shear according to Eurocode 6
- Stress state at the ultimate limit state for gravity loads and seismic actions according to Eurocode 8
- Response of masonry structures to in-plane and out-of-plane loading
- Pathology of masonry buildings. Typical forms of failure
- Materials and intervention techniques (repairs-strengthening) in existing masonry constructions

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught (30%). 2. Final written exam (in Greek) at the end of the semester (70%). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

Karantoni F., Masonry Structures, Design and Repairs, Papasotiriou publ., 2012 (in Greek)
Spyrakos K., Assessment and Repairs for Seismic Loads, Ergonomos publ., 2019 (in Greek)
Tasios Th., Masonry Mechanics, Symmetry publ., 1992 (in Greek)
Tomaseciv M, Seismic Design of Masonry Buildings, Kleidarithmos publ., 2004 (in Greek)
Stylianidis K Ignatakis Ch. Masonry Structures (according to Eurocodes 6 8), AUTh publ., 2010 (in Greek)

14.7.7. Engineering Seismology and Earthquake Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ005	**SEMESTER**	7th
COURSE TITLE	Engineering Seismology and Earthquake Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completion of the course, the students will be able to:
• be familiar with the basic rules of technical seismology, rupture processes of seismically active faults and the propagation of seismic ground motion
• be familiar with the basic provisions of Eurocode 8 that are related to the seismic design philosophy
• assess the expected seismic hazard in an area.
• make a basic analysis and interpretation of the seismic signal.

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

• Decision making
• Design and management of assignments
• student individual project
• Search, analysis and synthesis of information and data using the appropriate technology

SYLLABUS

• Technical seismology, seismicity, ground motion prediction equations. Seismic risk and seismic hazard.
• Ground motion. Characteristics, forms, dependent factors. Duration of seismic motion and influential factors.
• Near-field earthquakes. Effect of vertical component.
• Prediction of seismic motion. Seismic codes. Probabilistic analysis of seismic hazard. Seismic scenarios. Response spectra.
• Influence of site effects on the seismic response, soil liquefaction.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	See table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	1. Individual project aiming at better understanding the teaching concepts 2. Final written exam at the end of the semester (in Greek language)

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- [in Greek] Πιτιλάκης Κυριαζής: «Γεωτεχνική σεισμική μηχανική» Έκδοση: 1η έκδ./2010, ISBN: 978-960-456-226-8, Εκδότης: Ζήτη Πελαγία Σια Ι.Κ.Ε.
- [in Greek] Καρακαΐσης Γεώργιος, Παπαζάχος Βασίλης, Χατζηδημητρίου Παναγιώτης, «Εισαγωγή στη Σεισμολογία», Εκδόσεις Ζήτη, 2005, ISBN: 960-431-979-5
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14.7.8. Rock Mechanics and Tunnels

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ006	**SEMESTER**	7th
COURSE TITLE	Rock Mechanics and Tunnels		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is the student to be able to realize and assess the basic characteristics of geological (rock) and soil formations in relation to the design and construction of tunnels and underground structures.
Upon completion of the course, the student will be able to:
• to recognize, understand and assess the basic parameters of rock and soil formations and evaluate the parameters of their mechanical behavior
• to distinguish and select among the different approaches regarding the design and construction methods of underground structures.
• to assess and evaluate the level of safety due to the various risks of failure of a tunnel

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the acquirement of the following capabilities:
• Search, analysis and synthesis of information and data using the appropriate technology
• Decision making
• Student individual project
• Design of structures
• Respect of the physical environment

SYLLABUS

Design and analysis of tunnels and underground structures in a preliminary level. Excavation and support of underground structures and structural configuration based on the current code requirements.
Contents of the theory lectures and application exercises:
• Introduction to the subject of underground structures and their importance- Type of tunnels and different construction methods
• Geological and geotechnical parameters that are related to the underground structures
• Physical characteristics, mechanical behavior and failure criteria of the intact rock and rockmass.
• Mechanical behavior of rock and soil formations in relation to the construction of underground structures- pertinent laboratory tests to define critical characteristics
• Study and design of tunnels (distribution of stresses and deformations, excavation of tunnels, NATM and TBM methods, support of tunnel walls, waterproofing of tunnels, etc.). Presentation of numerical methods.
• Monitoring of the behavior of underground structures
• Specific construction subjects

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	

Use of ICT in teaching, laboratory education, communication with students	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam that comprises: •Theoretical questions of knowledge and critical thinking • Solving of problems-exercises Delivering of an individual project that comprises: • Processing and solving of subjects pertinent to the study of underground structures-tunnels • Examination of the basic concepts of the subject

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

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14.7.9. Special Topics in Geotechnical Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ007	**SEMESTER**	7th
COURSE TITLE	Special Topics in Geotechnical Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

• To recognize, understand and be able to evaluate the basic soil parameters related to its mechanical behavior under different loading conditions.

• To be able to understand the role of underground water and its multifaceted influence on soil behavior.

• To be able to identify the basic elements required for the design of special geotechnical engineering projects such as embankments, slopes, landslide protection projects, dams.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the acquirement of the following capabilities:

• Search, analysis and synthesis of information and data using the appropriate technology

• Decision making

• Student individual project

• Design of geostructures

• Respect of the physical environment

SYLLABUS

Deepening in soil behavior and study of special geotechnical engineering projects such as embankments, slopes, landslide protection projects, dams.

Content of theory lectures and practical exercises: • Connection with Soil Mechanics (soil characteristics, soil stresses, bearing capacity and soil settlements, active and passive earth pressures). • Intensive soil condition and loading history, stress paths, soil failure modes, residual soil strength, etc. • Influence of water on the mechanical behavior of soils. • Introduction to the design of special geotechnical engineering projects (embankments, slopes, landslide protection projects, dams).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam that comprises: •Theoretical questions of knowledge and critical thinking • Solving of problems-exercises Delivering of an individual project that comprises: • Processing and solving of subjects pertinent to the study of underground structures-tunnels • Examination of the basic concepts of the subject

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

[In Greek] Κωστόπουλος Σ.Δ. (2008), "Γεωτεχνικές Κατασκευές ΙΙ", Εκδόσεις Ίων, ISBN: 978-960-411-657-7
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14.7.10. Geo-environmental Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ008	**SEMESTER**	7th
COURSE TITLE	Geo-environmental Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Understand the basic parameters related to subsoil pollution both at the level of waste management and in terms of geotechnical/geological characteristics.
- Distinguish, recognize, and be able to evaluate cases of subsoil pollution.
- To perceive and understand the causes of pollution in each examined case and to be able to estimate the level of the problem.
- To propose solutions regarding the restoration of pollution that has occurred in specific case studies.
- Formulate solutions based on the knowledge acquired during the lessons, assessing the particular requirements of the problem at hand.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
- Search for, analysis and synthesis of data and information
- Decision-making
- Working independently
- Project planning
- Respect for the natural environment
- Working in an interdisciplinary environment

SYLLABUS

The course focuses on subsoil pollution and protective and remedial measures to be taken, regarding the management (transportation, storage and disposal) of waste of various kinds (solid and liquid waste, toxic substances, etc.).

Content of theory lectures and exercises:
- Introduction to the subject.
- Presentation of different forms of subsoil pollution (contamination from the management of solid and liquid waste, toxic substances, etc.). Effects of pollutants on the environment and on humans.
- Efficient waste management procedure in relation to the subsoil - Related code and legislation provisions. Protective measures to prevent pollution. Selection criteria and design of waste containment or disposal facilities and sites.
- Measures to address soil pollution - decontamination methods and remediation techniques.
- Case studies related to subsoil pollution problems.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.

TEACHING METHODS

The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	*Semester workload*
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

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- **[In Greek] Καββαδάς Μ. (2013), "Στοιχεία Περιβαλλοντικής Γεωτεχνικής", Εκδόσεις Τσότρας, ISBN: 978-618-80741-0-1**
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14.7.11. Geographic Information Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ007	**SEMESTER**	7th
COURSE TITLE	Geographic Information Systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will*

acquire with the successful completion of the course are described. *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to recognize the qualitative and quantitative dimensions of spatial data and geographic information systems, effectively utilize individual quantitative methods and techniques of geographic analysis and gain proficiency in Geographic Information System (GIS) software.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes in the acquisition of the following skills: - Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Working independently - Project planning and management - Respect for the natural environment

SYLLABUS

Introduction to Geographic Information Systems (GIS). Main concepts in GIS. Geodetic reference systems - projection systems. Spatial analysis and methodology. Entity representation: vector and raster models. Spatial and semantic data. Representation of vector and raster data. Topological data structure and analysis. Database structure and management - Database management systems. Thematic mapping. Cartographic rendering – spatial data visualization. Analysis in GIS. Pre-analytical processes. Vector data analysis. Grid element analysis. Spatial analysis methods [Point distributions: analysis of spatial patterns, Continuous surface distributions: analysis of spatial interpolation, Discontinuous surface distributions: analysis of surfaces as polygons - points]. Spatial sampling and sampling types. Integrated spatial approach. GIS - Spatial analysis and design.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material	
TEACHING METHODS	***Activity***	***Semester workload***

The manner and methods of teaching are described in detail. *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Lectures	52
	Individual study	48
	Practice/exercises	30
	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final wtitten examination (100%) -open ended questions -problem solving OR Final writtn examination (70%) assignment - optional (30%)	

ATTACHED BIBLIOGRAPHY

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14.7.12. Transportation Planning

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ008	**SEMESTER**	7th
COURSE TITLE	Transportation Planning		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

• assess the traffic impacts expected to arise from the implementation of transportation projects and the implementation of transport policies.

• take into account the above elements in the design of transportation systems, within the framework of decision-making processes.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes in the acquisition of the following skills:

- Investigation, analysis and synthesis of data and information, with the use of appropriate technologies
- Adaptation to new conditions
- Decision making
- Project planning and management
- Natural environment preservation

SYLLABUS

Course lecture content:

• Transportation system. Procedures and stakeholders. Types and subjects of studies in the field of transport.

• Transport planning concepts. Principles and relations of traffic flow, speed and density and other parameters.

• Sampling. • Data collection and processing methodology. • Models in transport planning and their statistical evaluation. • Trip Generation • Trip Distribution • Modal split • Disaggregated behavioral models. • Network trip assignment

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Lectures Presentation using laptop and video projector or remotely, e-lecture if required. • Learning process support through the electronic e-learning platform. • Distance meetings between teacher and students for collaboration outside of class (via a digital platform, e.g. ZOOM, Skype). • Posting announcements on the Department's website and on the online page of the course within the electronic e-learning platform. • Teacher and student communication via email. • Student evaluation
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam including: • Theory questions • Exercises solving The evaluation criteria are communicated to the students in the first lecture of the course. Also, each student is given the opportunity to check their writing and have their mistakes analyzed.

Activity	*Semester workload*
Lectures	52
Individual study	48
Practice/exercises	30
Course total (26 hours workload per ECTS credit)	***130***

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_Stathopoulos A.G., Karlaftis M., (2016). Transportation Systems Planning. Ed. PAPASOTIRIOU, ISBN: 978-960-491-101-1 [In Greek].

_Frantseskakis, I.M., Giannopoulos, G.A. (2005). Transportation Planning and Traffic Engineering. Epikentro Publications SA, ISBN: 978-960-6647-20-8 [In Greek].

14.7.13. Urban Transport Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ009	**SEMESTER**	7th
COURSE TITLE	Urban Transport Systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Understand the principles of design, study, evaluation, and operation of Mass Transportation Systems.
- Understand the principles of an urban freight transport system.
- Design an urban transportation system taking into account the principles of a sustainable mobility system.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*

Working in an international environment *Working in an interdisciplinary environment* *Production of new research ideas*	*Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the acquisition of the following skills:
- Search, analysis and synthesis of data and information, using the necessary technologies
- Adaptation to new conditions
- Decision making
- Project planning and management
- Natural environment preservation

SYLLABUS

Course lecture content:
- Public Transportation.
- Integrated Combined Urban Transport Systems.
- Urban passenger bus lines.
- Urban bus line design.
- Bus lanes and special lanes for the exclusive use of buses.
- Bus priority measures in mixed traffic conditions.
- Improvement and promotion of Mass Transportation.
- Fixed track mass transit systems.
- Urban freight transport.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Lectures Presentation using laptop and video projector or remotely, e-lecture if required. • Learning process support through the electronic e-learning platform. • Distance meetings between teacher and students for collaboration outside of class (via a digital platform, e.g. ZOOM, Skype). • Posting announcements on the Department's website and on the online page of the course within the electronic e-learning platform. • Teacher and student communication via email. • Student evaluation
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public*	Final written exam including: • Theory questions • Compulsory individual project with oral presentation in class The evaluation criteria are communicated to the students in the first lecture of the course. Also, each student is given the opportunity to check their graded sheet and have their

Activity	***Semester workload***
Lectures	52
Individual study	30
Project(s)	48
Course total (26 hours workload per ECTS credit)	***130***

presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	performance analyzed.

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_Gavanas, N., Papaioannou, P., Pichiava-Latinopoulou, M., Politis, I. (2016). Urban transport networks and mobility management. Greek Academic Electronic Books and Aids - "Kallipos" Repository, ISBN: 978-960-603-155-7 [In Greek].
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14.7.14. Transport Economics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ010	**SEMESTER**	7th
COURSE TITLE	Transport Economics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to collect data and classify construction and cash flows of a transportation system or enterprise, combine the above data to predict cost elements necessary for the construction or improvement of a transportation system or enterprise, implement this knowledge for determining the financial demands for the foundation and operation of transportation system or enterprise, to assess the efficiency of the invested funds, analyze the components and operations of transportation system or enterprise, to clarify, to classify and prioritize the, according to cost and criteria of function, compose the sum of individual cost estimates into a single framework of cash flow, anticipating future changes, running parallel with alternative scenarios, evaluate, justify and argue for the best investment in a of transportation system or enterprise, taking into account socio-economic, technical and environmental criteria.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Transportation and financial activities, transport systems, road, railway, air and maritime transport, transportation enterprises, effects of globalization, state monopolies, liberalization, privatization, elasticities, normal, inelastic and derivative demand, financial planning and accounting analysis of transport companies, construction and operational cost, combined transportation systems, logistics in freight transport, definition and characteristics of transport demand forecasting models, assessment of the predictive capability of a model, targets of the commercial policies of transport companies, public service obligations, pricing policies of transport companies, evaluation methods of transportation projects, sensitivity and risk analysis, multi-criteria and financial analyses of transportation projects, public-private partnership for the construction of transportation projects, transportation companies in Greece.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	**Activity** / **Semester workload** Lectures: 52 Individual study: 78 Course total (26 hours workload per ECTS credit): ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

ATTACHED BIBLIOGRAPHY

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14.7.15. Sustainable Urban Mobility

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ011	**SEMESTER**	7th

COURSE TITLE	Sustainable Urban Mobility

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to identify gaps in conventional approaches to transport for the achievement of sustainable urban mobility,
• Implement alternative approaches to the design of urban transport,
• Design infrastructure for non-motorized vehicles,
• Identify key factors that influence transport choices and transport behavior,
• Familiarize with current transport technologies,
• Define basic principles for drafting a Sustainable Urban Mobility Plan

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology

_Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

European transport policy for urban mobility • Urban mobility and analysis of commuters' travel behavior • Sustainable development and sustainable urban mobility • Sustainable transport modes (walking, cycling) and their infrastructure • Methodologies of road safety audit and mobility of pedestrians and cyclists in the urban environment • Shared transport, micromoblility • Autonomous and electric vehicles • Intelligent Transport Systems and sustainable urban mobility • Energy, environment and economy of transport • Safety, accessibility and social issues of transports • Sustainable Urban Mobility Plans.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td colspan="2">Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td colspan="2">Powerpoint presentations, e-learning platform for educational material</td></tr>
<tr><td rowspan="10">TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Individual study</td><td>78</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td colspan="2">Final written exam (100%) which includes:
- Open ended questions
- Problem solving questions (exercises)

The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.</td></tr>
</table>

ATTACHED BIBLIOGRAPHY

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14.7.16. Open Channel and River Hydraulics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ006	**SEMESTER**	7th
COURSE TITLE	Open Channel and River Hydraulics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
The successful completion of the course will enable students to - define the appropriate hydraulic method for solving complex problems related to open channel systems and river flows - design open channels and culverts of various dimensions - study of natural streams and determine water and solid discharge - determine channel conveyance and evaluate the impact of bridges on the flow in streams and rivers - propose and design river training and flood protection works - assess and apply computer codes for flow computations in streams and rivers.

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
- Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Team work - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking	

SYLLABUS

- Introduction to open channel. Application of theory of critical depth, flow over a step and through, narrowing and widening of a cross-section.
- Steady state free surface flow: Flow characteristics. Uniform flow. Definitions and equations.
- Manning and Chezy equations. Uniform flow in compound channels.
- Cross-sections of composite shape. Best hydraulic cross-section.
- Specific force. Critical depth. Calculation of critical depth. Control cross-sections.
-Gradually varied flow in streams and rivers. Computations.
-Hydraulic jump and its features. Hydraulic jump on horizontal channel. Location of hydraulic jump
-The code HEC-RAS (River Analysis System). Application examples.
-Profile classification.
-Flow calculations from spillways and lake outlets
-Sediment Discharge in natural streams. Bed Load. Suspended Load.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	**Activity** / **Semester workload** Lectures: 40 Practice/exercises: 12 Individual study: 78 Course total (26 hours workload per ECTS credit): ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Formative evaluation consisted of: - Non-compulsory intermediate essays (5 to 6 in total) (30% of final mark) focused on solving problems : - Final written exams (70% of final mark) consisted of: a) multiple choice and short answer questions on the basic theory of the course (10% of the final mark) b) Solving of problems/questions (60% of the final mark)

ATTACHED BIBLIOGRAPHY

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14.7.17. Urban Waste Treatment Technology

GENERAL

SCHOOL	Engineering
ACADEMIC UNIT	CIVIL ENGINEERING
LEVEL OF STUDIES	Undergraduate

COURSE CODE	ΥΔΡ007	**SEMESTER**	7th	
COURSE TITLE	Urban Waste Treatment Technology			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- know the basic water and wastewater treatment processes
- distinguish and explain the treatment stages of a municipal wastewater treatment plant
- analyse water quality characteristics and distinguish water pollution
- calculate the hydraulic layout of municipal wastewater treatment projects
- assess water and wastewater treatment studies
- prepare a technical report containing the sanitary calculations, hydraulic calculations and general arrangement drawings of relative projects

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search, analysis and synthesis of data and information
- Adapting to new situations

- Decision making
- Individual work
- Project design and management
- Criticism
- Promoting free, creative and inductive thinking

SYLLABUS

The course aims to provide students with the basic theoretical background for the course 'YDR007 Municipal Wastewater Treatment and Management'. It includes the necessary teaching material for understanding the treatment of natural water towards the production of high quality water through purification processes and methods and the analysis of wastewater treatment processes, as well as the design of relative projects.

Lectures' content:

o The hydrological cycle. Groundwater, surface water, seawater. Water consumption.

o Water quality characteristics (physico-chemical and microbiological parameters). Legislative framework. Water pollution – contamination. Protection measures.

o Groundwater and surface water treatment processes. Standard treatment, advanced treatment.

o Water treatment plants: Flocculation, sedimentation, filtration, adsorption, disinfection, water storage and distribution.

o Typical wastewater treatment system. Preliminary and primary treatment. General principles of wastewater and sludge treatment.

o Introduction to the activated sludge model (organic carbon removal and nitrification). Aeration tank design criteria. Sedimentation tank design and operation.

o Analysis of sludge treatment processes. Sludge thickening (gravity thickeners, mechanical thickeners). Sludge stabilisation (aerobic and anaerobic digestion). Sludge dewatering. Sludge disposal and utilisation.

o Design principles for pre-treatment, primary treatment, biological treatment and tertiary treatment of municipal wastewater.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Support of the learning process (Teaching and Communication with students) through PowerPoint lectures, through the course website, through the e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites and scientific articles) posted on the e-learning page. Teacher-student collaboration time either by physical presence or by teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Project(s)	10
Individual study	68
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of Evaluation: Greek Written test with extended answer questions (formative and/or inferential) Theory assessment (80% of the final grade): • A written progress examination (20% of the final grade) including: - Theoretical Extended Response Questions (formative and/or inferential) - Problem-solving exercises • Written final examination (60% of the final grade) including: - Theoretical extended response questions (formative and/or inferential - Problem-solving exercises Individual homework (20% of the final grade) The present course description with the assessment criteria is accessible to students in the Departmental study guide (Departmental website) and on the course website. The outline is communicated orally to students during the first lecture.

ATTACHED BIBLIOGRAPHY

• [in Greek] Νταρακάς Ευθύμιος, ΤΕΧΝΙΚΗ ΠΕΡΙΒΑΛΛΟΝΤΟΣ, Διεργασίες Επεξεργασίας Νερού και Υγρών Αποβλήτων, Εκδόσεις Εκδόσεις "σοφία", 2016, ISBN: 978-960-6706-91-2. Κωδικός Βιβλίου στον Εύδοξο: 59380527
• [in Greek] Νταρακάς Ευθύμιος, Πεταλά Μαρία, Τσιρίδης Βασίλειος, Περιβαλλοντική Χημεία και Μηχανική, Εκδόσεις ΤΖΙΟΛΑ, 2019, ISBN: 978-960-418-640-2. Κωδικός Βιβλίου στον Εύδοξο: 86054621
• [in Greek] Ανδρεαδάκης Α., Επεξεργασία Νερού Βασικές Αρχές και Διεργασίες, Εκδόσεις Συμμετρία, 2008, ISBN: 978-960-266-207-6. Κωδικός Βιβλίου στον Εύδοξο: 45236
• [in Greek] Κούγκολος Αθανάσιος, Περιβαλλοντική Μηχανική, Εκδόσεις ΤΖΙΟΛΑ, 2021 (3η έκδοση), ISBN: 978-960-418-868-0. Κωδικός Βιβλίου στον Εύδοξο: 94688998
• [in Greek] Γκουντούλας Κων/νος, Διαχείριση Ιλύος από Εγκαταστάσεις Επεξεργασίας Λυμάτων, Εκδόσεις ΑΛΕΞΑΝΔΡΟΣ Ι.Κ.Ε., 2019 (2η έκδοση), ISBN: 978-618-84462-2-9. Κωδικός Βιβλίου στον Εύδοξο: 86200230

14.7.18. Computational Methods in Fluid Mechanics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ008	**SEMESTER**	7th
COURSE TITLE	Computational Methods in Fluid Mechanics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of this course, students will be able to: recognize and identify the basic principles of numerical methods reported for solving fluid mechanics problems solve fluid flow equations and systems of equations using computational techniques and synthesize numerical fluid flow analysis models
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Working independently _Project planning and management _Criticism _Production of free, creative and inductive thinking.

SYLLABUS

Computational Fluid Mechanics. Basic considerations, flow equations and function and required numerical algorithm development steps. Fluid flow numerical solving techniques. Types of partial differential equations for flow mechanics and ierative processes for solving.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of Evaluation: Greek. Written test with extended answer questions (formative and/or inferential). Theory assessment (100% of the final grade): • A written progress examination (30% of the final grade) including: _Theoretical Extended Response Questions (formative and/or inferential) _Problem-solving exercises. • Written final examination (70% of the final grade) including: _Theoretical extended response questions (formative and/or inferential) _Problem-solving exercises. The present course description with the assessment criteria is accessible to students in the Departmental study guide (Departmental website) and on the course website. The outline is communicated orally to students during the first lecture.

Activity	*Semester workload*
Lectures	40
Practice/exercises	12
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek] Σούλης Ιωάννης, ΥΠΟΛΟΓΙΣΤΙΚΗ ΜΗΧΑΝΙΚΗ ΡΕΥΣΤΩΝ, Εκδόσεις ΧΑΡΑΛΑΜΠΟΣ ΝΙΚ. ΑΪΒΑΖΗΣ, 2008, ISBN: 978-960-99293-2-5. Κωδικός Βιβλίου στον Εύδοξο: 1100
- [In Greek] Σούλης Ιωάννης, Υπολογιστικές τεχνικές Υδραυλικής Μηχανικής, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", 2016, ISBN: 978-960-603-044-4. Κωδικός Βιβλίου στον Εύδοξο: 320306
- [In Greek] Κουτίτας Χριστόφορος, Υπολογιστική υδραυλική, Εκδόσεις Επίκεντρο, 2005, ISBN: 978-960-6645-50-1. Κωδικός Βιβλίου στον Εύδοξο: 15198
- [In Greek] Μπεργελές Γ., Υπολογιστική ρευστομηχανική, Εκδόσεις Συμεών, 2012 (5η έκδοση), ISBN: 978-960-9400-37-4. Κωδικός Βιβλίου στον Εύδοξο: 59374709
- [In Greek] Στάμου Αναστάσιος, Εφαρμοσμένη Υδραυλική, Εκδόσεις Παπασωτηρίου, 2016 (3η έκδοση), ISBN: 978-960-491-109-7. Κωδικός Βιβλίου στον Εύδοξο: 59397206

8th Semester Courses

14.8.1. Reinforced Concrete III

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ024		**SEMESTER**	8th
COURSE TITLE	Reinforced Concrete III			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=990			

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of this course, students will be able to:
- know the basic water and wastewater treatment processes
- distinguish and explain the treatment stages of a municipal wastewater treatment plant
- analyse water quality characteristics and distinguish water pollution
- calculate the hydraulic layout of municipal wastewater treatment projects
- assess water and wastewater treatment studies
- prepare a technical report containing the sanitary calculations, hydraulic calculations and general arrangement drawings of relative projects

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim? *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
- Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Working independently - Team work - Working in an interdisciplinary environment - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking

SYLLABUS

• Seismic design actions according to Eurocode 8 for frame and dual reinforced concrete structures
• Medium and high ductility structures according to Eurocode 8
• Capacity design of beams, columns and shear walls. Avoidance of soft-storey failure, of local plasticity checks.
• Dimensioning of reinforced concrete shear walls (design envelopes against bending and shear)
• Medium and high ductility nodes
• Simulation of a dual reinforced concrete structure (frames and walls) in a finite element program. Calculation of element forces envelopes.
• Pathology of reinforced concrete structures

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught (30%).

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58
Course total (26 hours workload per ECTS credit)	***130***

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	2. Final written exam (in Greek) at the end of the semester (70%). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

ATTACHED BIBLIOGRAPHY

Penelis G., Stylianidis K., Kappos A., Ignatakis Ch., Design of Reinforced Concrete Structures According to the New Concrete and Seismic Codes, AUTh publ., 1995 (in Greek)
Georgopoulos Th., Reinforced Concrete vol. II, Georgopoulos publ., 2015 (in Greek)
Tsonos A.D., Design of Reinforced Concrete Structures according to the Eurocodes, Sofia publ., 2016 (in Greek)
Penelis G Penelis Gr., Concrete Buildings in Seismic Regions, 2nd ed, 2019, Taylor Francis
Karayiannis Ch., Design and Performance of Reinforced Concrete Structures for Seismic Loads, Sofia publ., 2016 (in Greek)
Konstantinidis Ap., Earthquake Resistant Buildings made of reinforced concrete. Static and dynamic analysis, π-Systems, 2013
Konstantinidis Ap., Earthquake Resistant Buildings made of reinforced concrete. made of reinforced concrete, The Art of Construction and the Detailing, π-Systems, 2014

14.8.2. Earthquake Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ023	**SEMESTER**	8th
COURSE TITLE	Earthquake Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/enrol/index.php?id=1035

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, students will be able to: become familiar with the background of seismic design for structures delve into the determination of seismic actions through design response spectra understand the concept and estimate the ductility of structures become familiar with the philosophy of performance-based seismic design know how to apply non-linear analysis methods for the design and assessment of structures against seismic actions get acquainted with new technologies in seismic design, such as seismic isolation. recognize seismic damage and propose methods for their restoration, as they will learn the appropriateintervention technologies

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
- Search for, analysis and synthesis of data and information, with the use of the necessary technology - Adapting to new situations - Decision-making - Working independently - Team work - Working in an interdisciplinary environment - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking	

SYLLABUS

• Elements of Technical Seismology. Earthquake genesis – distribution. Strong ground motion – recordings. Magnitude and intensity. • Seismic hazard – risk. Elements of Seismic Mechanics. • Elastic response spectra. Inelastic response – hysteretic damping – ductility. Design spectra. • Building analysis for seismic actions. Plasticity of structural elements and carriers. • Background of seismic design regulatory provisions. • Structural elements under seismic load. Beam-column nodes under seismic load. • Seismic pathology. Technology of repair and strengthening of buildings.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

Activity	*Semester workload*
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

Psycharis I., Earthquake Engineering Notes Vol. 1, NTUA publ., 2016 (in Greek)
Chopra, A.K. (1995) Dynamics of Structures: Theory and Applications to Earthquake Engineering. Prentice-Hall, New Jersey
Fardis, Michael, et al. Designers' Guide to EN 1998-1 and 1998-5. Eurocode 8: Design Provisions for Earthquake Resistant Structures. Thomas Telford Publishing, 2005.
Anastasiadis K., Earthquake Resistant Structures vol. I, Ziti, 1989 (in Greek)

14.8.3. English-Technical terminology

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΝ010	**SEMESTER**	8th
COURSE TITLE	English-Technical terminology		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**

	2	0
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Skills Development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to read and use technical terminology in the field of Civil Engineering, both in oral speech and in text.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Working independently
- Team work

SYLLABUS

Students are introduced to a variety of academic and technical texts and forms of writing, oriented towards the field of civil engineering. They also are encouraged to develop their oral expression and speech skills.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written examination comprising of open-ended questions, writing in English and text translation.

Activity	*Semester workload*
Lectures	
Individual study	
Course total (26 hours workload per ECTS credit)	***0***

ATTACHED BIBLIOGRAPHY

_Evans Virginia, Dooley Jenny, Chavez Mark (2015), “Career Paths Construction 1 Buildings Student's Book With Cross-Platform Application”, EXPRESS Publishing.
_ Evans Virginia, Dooley Jenny, Chavez Mark, “Career Paths Construction 2 Roads Highways Student's Book With Cross-Platform Application”, EXPRESS Publishing.
_Panourgia E. (2015), “Integrating Technical Academic Writing into your English Course - Theory and Practice”, ΑΛΕΞΑΝΔΡΟΣ Σ. I.K.E.

14.8.4. Numerical Simulation and Analysis of Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ025	**SEMESTER**	8th
COURSE TITLE	Numerical Simulation and Analysis of Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**

	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=712

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

• Recognize, understand and classify the type of finite elements used in a case study.

• Distinguish and comprehend the parameters and assumptions related to simulation issues and identify potential weaknesses when simulating specific structures.

• Select the appropriate simulation approach, potentially combining different types of finite element types and parameters.

• Develop, using appropriate computing tools (specialized computer software), computing models by assembling individual parts of the examined problem.

• Integrate skills from different fields, while complying with the contemporary code provisions, in a unified structural simulation and analysis environment, in order to solve a civil engineering problem.

• Evaluate the effectiveness and assess the accuracy of selected simulation approaches, both on the basis of the general principles learned during the lectures as well as on the basis of critical evaluation of analysis results.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

• Search, analysis and synthesis of information and data, utilizing the required technology

• Decision making

• Working independently • Project planning

SYLLABUS

The aim of the course is to help the student understand the basic principles of simulation and analysis of structures utilizing computer software (Computer Aided Analysis) and following the code regulations, in order to develop the ability to synthesize and apply knowledge from different topics of the civil engineering scientific field.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Learning and utilization of specialized structural analysis software (computer aided analysis). Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	28
Individual study	50
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final exam including: • Theoretical knowledge and judgment questions on course subjects • Questions on structural simulation and behavior issues • Assessment of understanding of key concepts Lab examination (in specialized computer software) including: • Simulation of a case study • Analysis and evaluation of results

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• CEN, European Committee for Standardization (2004), "EN 1998–1: Eurocode 8: Design of structures for earthquake resistance, Part 1: General rules, seismic actions and rules for buildings", European Committee for Standardisation, Brussels

14.8.5. Prestressed Reinforced Concrete - Special Concrete Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ026	**SEMESTER**	8th
COURSE TITLE	Prestressed Reinforced Concrete - Special Concrete Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.
Consult Appendix A
- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of*

the European Higher Education Area

- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon successful completion of the course students will be able to:
1. Understand the behavior and design principles of prestressed concrete structures for various prestressing methods.
2. To design and dimension prestressed concrete structural elements against bending and shear.
3. Calculate the stress state of prestressed members, calculate the prestress losses and design the tendons.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*......*
Production of new research ideas	*Others...*
	....

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Project planning and management _Decision making.
_Autonomously working
_Promotion of free, creative and inductive thinking

SYLLABUS

_Principles of design of prestressed structures. Prestressing materials and techniques. Types, characteristics and mechanical properties of tendons.
_Prestressing systems.
_Structural elements under central or eccentric prestressing force.
_Design at the serviceability limit state.
_Cracking check.
_Preload losses (momentary and long-term)
_Tendon anchoring systems. Single and multiple anchoring systems.
_Design to failure limit state. Bending and shear checks.
_Partial prestressing.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art*	

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58

workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***130***</td></tr></table>
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The final evaluation is composed of marks collected from different parts of the teaching process, as follows: 1. Individual compulsory project (30% of the final grade) 2. Final written exams (70% of final grade)

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14.8.6. Architectural Design

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ027	**SEMESTER**	8th
COURSE TITLE	Architectural Design		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO	No

ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
• Recognize and define the concepts of Space, Architecture and Architectural Design - understand and use of the relevant terminology. Analyze small scale architectural projects. • Understand the purpose of Architectural Design (historically, socially, culturally, environmentally, technologically) and review its methodology. Define and distinguish the role and responsibilities of the head designer within a group of engineers having to produce a building project. • Evaluate the specificities of the designing of a medium architectural complexity project (i.e. suburban detached house), distinguish and prioritize parameters which determine architectural and constructional aspects of the project, classify and illustrate design principles. Create and present the synthetic concept (main design idea). • Understand and apply the constantly needed modifications in the designing process, become able to adopt this kind of flexibility, apply methods and tools that support an adaptability process. • Create (design) small to medium scale building projects of simple functional requirements and simple but well-defined morphological identity. Organize and present these proposals with a maximum level of quality and completeness. • Evaluate in comparison different designed or constructed building-project proposals and decide for interventions or final options which will support the projects' sustainability and bring the optimal conditions for the final occupants.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Working independently
_Team work
_Working in an international environment
_Working in an interdisciplinary environment
_Production of new research ideas
_Project planning and management
_Respect for difference and multiculturalism

_Respect for the natural environment _Criticism and self-criticism _Production of free, creative and inductive thinking

SYLLABUS

The course introduces students to basic concepts of Space, Architecture and Architectural Design with the aim of understanding the importance of architectural projects and mastering an established scientific language that is used internationally, in the context of the interdisciplinarity required when different Engineers specialties collaborate for Construction. Emphasis is placed on the methodological, analytical and synthetic character of Architectural Design with the aim of familiarizing and acquiring basic knowledge about concepts such as spatial Form and Function, the integration of the building into its environment (context), the central synthetic idea (concept) and its transformations, the publicization and communication of the architectural projects, the dialogue of the composer (Architect/ Engineer) with the scientific and technical world, as well as with the final recipients of his work (inhabitants).

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Powerpoint presentations, e-learning platform for educational material</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Practice/exercises</td><td>26</td></tr>
<tr><td>Project(s)</td><td>38</td></tr>
<tr><td>Individual study</td><td>40</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>The final evaluation is composed of marks collected from different parts of the teaching process, as follows:
_Written or oral examination (end of semester): 50% of the final grade
_ Quality of exercises, assignments, and design projects (developed during the semester): 40% of the final grade
_Participation in the course procedures (i.e. oral participation, meeting deadlines for handing in written work): 10% of the final grade.
The evaluation criteria are listed in the introductory handout of the course, which is posted on the e-learning platform in the beginning of the semester and is also distributed and presented to the students during the 1st class meeting.</td></tr>
</table>

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_Kleine, G. Quibe, J., 1997. Houses: typology and form. Athens: Giourdas Editions [in Greek].
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14.8.7. Elastic Stability

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ028	**SEMESTER**	8th
COURSE TITLE	Elastic Stability		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students are expected to:
1) Identify problems related to the stability of structural elements and constructions.
2) Select appropriate strategies for addressing stability problems under static and dynamic loads.
3) Determine equilibrium paths and critical points in structures depending on the applied loading.
4) Evaluate the behavior of structural elements against buckling
5) Dimension the members and connections of the load-bearing system.

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Principles of the elastic stability theory. Stable, unstable and neutral equilibrium. Bending as a stability issue. Differential bending equation.
Influence of axial forces. Bending as an eigenvalue problem. The influence of boundary conditions.
Stability criterion - Stability determinant, Orthogonality condition of functions. Energy methods (Timoshenko total potential). Rayleigh-Ritz and Galerkin methods.
The problem of elastic stability of surface structures. Strength and stability checks of shells, thin plates, tanks, and silos.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

Activity	*Semester workload*
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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14.8.8. Digital Tools for Design and Construction

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ029	**SEMESTER**	8th
COURSE TITLE	Digital Tools for Design and Construction		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of*

- *the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to work with a range of different software for the creation and constructional support of 3D objects. They should be able to model 3D geometry of a building or smaller structure, to share and transfer information from one software to the other, to select and share information required from other collaborating engineers and to familiarize with the BIM procedures (schedules, cost estimates) that will be required of them to participate in complex buildings.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

Search for, analysis and synthesis of data and information, with the use of the necessary technology Adapting to new situations, Decision-making, Working independently, Team work, Working in an international environment, Working in an interdisciplinary environment . Production of new research ideas

SYLLABUS

The course aims to introduce students to the creation of 3D geometry and 3D modeling in order to support the construction of buildings. BIM, CAD/CAM technologies, 3D printing and parametric modeling are key concepts that are presented and form the core of the projects handed to students. Special emphasis is placed on the sharing of information and the interoperability between different software. Students work with AutoCAD (3D), Revit and Rhinoceros, enabling them to work with a wide range of 3D modeling tools, depending on the task at hand, indicating the digital expertise needed to collaborate on a multitude of levels with other fields of engineering (geometry clashes, schedules, cost estimates, thermal performance, building maintenance, etc.) according to the project's unique features.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, CAD software (AutoCAD, Revit), parametric modeling software (Rhinoceros), e-learning platform for educational material.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art*	**Activity** / **Semester workload** Lectures: 20 Project(s): 30 Project(s): 40 Individual study: 40

Activity	*Semester workload*
Lectures	20
Project(s)	30
Project(s)	40
Individual study	40

workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Course total (26 hours workload per ECTS credit) — ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	- Short examination assignment (30%) - Individual assignment (compulsory) (30%) - Group assignement (compulsory) (40%)

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https://www.autodesk.com/
https://www.cibse.org/sde

14.8.9. Special Topics in Steel Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ030	**SEMESTER**	8th
COURSE TITLE	Special Topics in Steel Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students are expected to:

• Calculate critical loads of flexural buckling and the corresponding buckling lengths for axially compressed beams, frame members, or others.

• Assess the influence of geometric imperfections, second-order effects, residual stresses and shear deformation of a member's cross-section, on the bearing capacity of elements under axial compression.

• Understand and design steel structural elements consisting of plates with or without stiffeners.

• Design simple cases of cylindrical steel shells.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Forms of instability of compressed truss elements. Second-order equilibrium (deformed state) of axially compressed rods. The influence of elastic supports on the critical load. Calculation of critical loads and the corresponding buckling lengths. The influence of the axial compressive force on the load-bearing capacity of a beam under simultaneous bending loads. • Influence of residual stresses and shear deformation on the strength and load-bearing capacity of compressed elements. Regulatory provisions of EC3. • Strength of planar steel structural elements stressed within their plane (discs). • Load-bearing capacity of steel shells.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

ATTACHED BIBLIOGRAPHY

Vagias I, Gantes Ch., Ermopoulos I., Ioannidis G., Application Examples in Special Issues on Steel Structures, Kleidarithmos publ., 2014 (in Greek)

14.8.10. Deep Foundations

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΓΕΩ009	**SEMESTER**	8th	
COURSE TITLE	Deep Foundations			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the teaching is the understanding of the concepts and theoretical principles of deep foundations and the ability to deal computationally with basic problems in this subject.

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

• To recognize the various types of deep foundations and especially pile foundations.

• To recognize, understand and be able to evaluate the cases in which the use of deep foundation is required.

• To distinguish and understand the basic physical and mechanical soil parameters related to the study and analysis of deep foundations.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management* *Respect for difference and multiculturalism*

Adapting to new situations *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
• Decision making • Design of assignments • Student individual project • Promotion of the free, creative and inductive thinking	

SYLLABUS

Study, analysis and design of various types of deep foundations and especially pile foundations. It includes the determination of the loading, the calculation of the intensive state and the process of designing, reinforcement and structural configuration based on the modern regulations.
Content of theory lectures and practical exercises:

- Introduction to the types of deep foundations and their construction methods
- Single pile and pile group bearing capacity study under axial loading
- Single pile and pile group bearing capacity study under horizontal loading
- Calculation of single pile and pile group settlements
- Special topics for the study of pile foundations (pile-soil interaction, non-linear analysis, negative friction, test loads, etc.).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Individual project aiming at better understanding the teaching concepts 2. Final written exam at the end of the semester (in Greek language)

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

[In Greek] Αναγνωστόπουλος Α.Γ., Παπαδόπουλος Β.Π. (2004), "Θεμελιώσεις με Πασσάλους", Εκδόσεις Συμεών, ISBN: 978-960-7888-50-2
[In Greek] Κωμοδρόμος Α.Μ. (2019),"Θεμελιώσεις, Αντιστηρίξεις: οριακή ισορροπία – αριθμητικές μέθοδοι (2η έκδοση)", Εκδόσεις Κλειδάριθμος, ISBN: 978-960-461-952-8
[In Greek] Κωστόπουλος Σ.Δ. (2008),"Γεωτεχνικές Κατασκευές Ι (2η έκδοση)", Εκδόσεις Ίων, ISBN: 960-411-563-4
[In Greek] Γεωργιάδης Κ., Γεωργιάδης Μ. (2009), "Στοιχεία Εδαφομηχανικής", Εκδόσεις ΖΗΤΗ, Θεσσαλονίκη, ISBN: 978-960-456-157-5
[In Greek] Barnes G.E. (2014), "Εδαφομηχανική: Αρχές και Εφαρμογές (3η έκδοση)", Εκδόσεις Κλειδάριθμος, Αθήνα, ISBN: 978-960-461-578-0

14.8.11. Deep Excavations and Earth Retaining Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ010	**SEMESTER**	8th
COURSE TITLE	Deep Excavations and Earth Retaining Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the student will be able to:
• To recognize the different types of Deep Excavations and Earth Retaining Structures.
• Be able to perceive and evaluate soil and structure's parameters related to excavations.
• To be able to desing and assess basic types of supports in simplified soil cases under simple and complex loading cases.
• To propose and/or synthesize solutions based on the theories she/he has been taught for the most appropriate choice of support type, evaluating the requirements of the problem she/he faces each time.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

• Decision making
• Design of assignments
• Student individual project
• Promotion of the free, creative and inductive thinking

SYLLABUS

Study, analysis and designing of various types of excavations and retaining walls. It includes the determination of the loading and the designing and construction configuration of the elements under study based on the modern regulations.
Content of theory lectures and practical exercises:
• Presentation of excavation methods and types of retaining walls (flexible, with or without anchors, rigid, support systems, etc.)
• Connection with soil mechanics (soil characteristics, horizontal soil stresses).
• Methods for calculating earth pressures during the design of retaining walls (Rankine, Coulomb, regulatory framework based on EC7, etc.).
• Study and designing of different types of retaining walls.
• Addressing issues related to groundwater.
• Special cases of retaining walls (diaphragm walls, reinforced or reinforced soil, use of geotextiles, etc.).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art*	

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48

workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*		
	Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Individual project aiming at better understanding the teaching concepts 2. Final written exam at the end of the semester (in Greek language)

ATTACHED BIBLIOGRAPHY

[In Greek] Κωμοδρόμος Α.Μ. (2019),"Θεμελιώσεις, Αντιστηρίξεις: οριακή ισορροπία – αριθμητικές μέθοδοι (2η έκδοση)", Εκδόσεις Κλειδάριθμος, ISBN: 978-960-461-952-8

[In Greek] Κωστόπουλος Σ.Δ. (2008), "Γεωτεχνικές Κατασκευές ΙΙ", Εκδόσεις Ίων, ISBN: 978-960-411-657-7

[In Greek] Κωστόπουλος Σ.Δ. (2008), "Γεωτεχνικές Κατασκευές Ι (2η έκδοση)", Εκδόσεις Ίων, ISBN: 960-411-563-4

[In Greek] Αναγνωστόπουλος Χ., Χατζηγώγος Θ., Αναστασιάδης Α., Πιτιλάκης Δ. (2012), "Θεμελιώσεις-Αντιστηρίξεις και Γεωτεχνικά Έργα", Εκδόσεις Αϊβάζης, Θεσσαλονίκη, ISBN: 978-960-549-000-3

[In Greek] Γεωργιάδης Κ., Γεωργιάδης Μ. (2009), "Στοιχεία Εδαφομηχανικής", Εκδόσεις ΖΗΤΗ, Θεσσαλονίκη, ISBN: 978-960-456-157-5

14.8.12. Soil Dynamics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ011	**SEMESTER**	8th
COURSE TITLE	Soil Dynamics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	

LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
The aim of the course is the students to understand the basic concepts of the dynamic behavior of soil deposits and to be capable of assessing the seismic soil response at the ground surface taking into account site effects. Upon completion of the course, the students will be able to: • be familiar with, understand and assess the basic parameters of soil and seismic ground motion that are related to the seismic wave propagation. • distinguish and be aware of the critical parameters of strong ground motion that are related to the damage of the physical and human environment (seismic ground shaking of buildings and other structures, seismic loading of networks, soil liquefaction, landslides etc.) • evaluate the seismic ground motion at the ground surface of a soil deposit for a given time history at the seismic bedrock • compose solutions through theories that they have learnt using the current design framework.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
• Decision making • Design of assignments • student individual project • promotion of the free, creative and inductive thinking

SYLLABUS

Study of site effects on the propagation of seismic ground motion from the seismic bedrock up to the ground surface. Distinction and assessment of the main parameters of strong ground motion and detection of unfavorable conditions that may take place due to the soil behavior during an earthquake. Assessment and consideration of the above based on the current design framework. Contents of the theory lectures and application exercises: • Connection with technical seismology and revision of basic concepts of seismic mechanics

(characteristics of earthquake disruption, ground motion prediction equations, parameters of seismic motion etc.) • Deepening on the description and parameters of strong ground motion and assessment of the hazard of seismic events based on them (time histories, Fourier spectra, response spectra, duration of strong ground motion etc.) • Introduction to site effects and on the concepts of soil dynamics • Estimation of soil parameters that influence the dynamic response of soil deposit (in situ and laboratory methods, nonlinear soil behavior) • Evaluation of seismic response of soil deposit. Theoretical approach and use of appropriate software for the estimation of soil response at the ground surface (linear behavior, equivalent linear behavior, nonlinear soil behavior) • Consideration of seismic ground motion amplification due to site effects in current codes • Microzonation studies. • Specific situations of seismic soil behavior and their consideration according to the current codes (influence of 2D-3D phenomena, liquefaction, lateral spreading etc) Presentation of advanced calculation methods using finite element programs.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Individual project aiming at better understanding the teaching concepts 2. Final written exam at the end of the semester (in Greek language)

Activity	*Semester workload*
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

• [In Greek] Πιτιλάκης Κ. (2010), "Γεωτεχνική Σεισμική Μηχανική", Εκδόσεις Ζήτη, Θεσσαλονίκη, ISBN: 978-960-456-226-8
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14.8.13. Laboratory and Field Tests in Soil Mechanics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ012	**SEMESTER**	8th
COURSE TITLE	Laboratory and Field Tests in Soil Mechanics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Recognize, understand and evaluate the basic physical and mechanical properties of the soil.
- Distinguish the stages of performing laboratory experiments and in-situ soil testing.
- Perform basic soil mechanics laboratory tests.
- Determine which laboratory or field tests are appropriate (as well as combine individual tests) in order to estimate the required soil properties.
- Calculate soil parameters from test results and qualitatively assess the expected soil behavior.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
	Respect for the natural environment

Decision-making *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:

- Search, analysis and synthesis of data and information
- Decision-making
- Working independently
- Project planning

SYLLABUS

Content of theory lectures and practical exercises:

- Relation to Soil Mechanics (soil characteristics, physical and mechanical soil properties).
- Common soil mechanics laboratory tests (theoretical presentation and laboratory applications)
- Presentation of tests and field research
- Specialized soil tests (determination of dynamic soil behavior properties, geophysical investigations)
- Monitoring soil behavior with instrumentation
- Code provisions – testing requirements – mandatory application cases.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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- [In Greek] Παπαχαρίσης Ν. Γραμματικόπουλος Ι., Ανδρεάδου-Μάνου Ν. (2015), "Γεωτεχνική Μηχανική: Έρευνα-Γεωτρήσεις-Εργαστήριο (3η έκδοση)", Εκδόσεις Κυριακίδη ΙΚΕ, ISBN: 978-618-5105-88-4
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14.8.14. Special Topics in Highway Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ012	**SEMESTER**	8th
COURSE TITLE	Special Topics in Highway Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to recognize basic principles for the design of intersections and interchanges
• Identify criteria for installing road restraint systems
• Identify specifications and instructions for road work signs
• Design driveways and implement the access management principles
• Cite road safety audit procedures
• Use of computers in road design.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Working independently
_Project planning and management
_Respect for the natural environment.

SYLLABUS

The use of computers in road project design
• Digital terrain models
• Road projects design software
• Basics on junction design
• Road restraint systems
• Road work signs
• Driveways and access management
• Road safety audit procedures.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*	see table below

Activity	***Semester workload***
Lectures	52
Individual study	48
Practice/exercises	30

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS		
	Course total (26 hours workload per ECTS credit)	***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.	

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- [in Greek] Οδηγίες Μελετών Οδικών Έργων, Τεύχος 5: Πρόσθετες Λωρίδες Κυκλοφορίας (ΟΜΟΕ-ΠΛΚ), ΥΠΕΧΩΔΕ, ΓΓΔΕ/ΔΜΕΟ, Έκδοση: 30/01/2001.
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- U.S. Department of Transportation, Federal Highway Administration (2000). ROUNDABOUTS: An Informational Guide. FHWA-RD-00-067.

14.8.15. Road Operation and Traffic Management

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ013	**SEMESTER**	8th

COURSE TITLE	Road Operation and Traffic Management		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing the course students should be able to define concepts in road operation and traffic management, • Traffic operations and road maintenance, • Intelligent Transport Systems, • Traffic Management Centers. • To analyze, schedule and deal with issues concerning traffic congestion, incidents, special events, demand, and parking. • To recognize the procedures of inspection and maintenance of the road network with technical and economic data.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search, analysis and synthesis of data and information, with the use of the necessary technology

_Adapting to new conditions _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Road operations and traffic management • Traffic operations and road maintenance • Institutional framework in Greece • Intelligent Transport Systems • Traffic Management Centers • Congestion management • Incident management • Special events management • Demand management • Parking management • Inspections and maintenance, procedures, types, indexes, intervention planning • Economic methods of road and traffic management.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lectures Presentation using laptop and video projector or remotely, e-lecture if required. Learning process support through the electronic e-learning platform. Distance meetings between for collaboration beyond class (via a digital platform, e.g. ZOOM, Skype). Posting announcements on the Department's website and on the online page of the course within the electronic e-learning platform. Teacher and student communication via email.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are communicated to the students in the first lecture of the course. Also, each student is given the opportunity to check their graded sheet and have their

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	performance analyzed.

ATTACHED BIBLIOGRAPHY

-Mouratidis, A.K. (2008). Road Construction, Road Projects Management. University Studio Press, ISBN: 978-960-12-1759-8 [In Greek].
-Franzeskakis, I.M., Golias, I.K., Pichiava-Latinopoulou, M.H. (2009). Traffic Engineering. Ed.PAPASOTIRIOU co, ISBN: 978-960-7182-42-5 [In Greek].
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14.8.16. Road Safety

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ014	**SEMESTER**	8th
COURSE TITLE	Road Safety		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*

- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to define procedures for road safety evaluation in urban and interurban road network, as well as methods of increasing level of road safety, to evaluate the effectiveness of road safety measures and the economic impact of road accidents.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Project planning and management
_Respect for the natural environment.

SYLLABUS

Introduction to road safety, road safety statistics,
• Data collection and data bases
• Road safety management
• Road safety studies
• Identification of black spots
• Road safety and the users, the road and the vehicles
• Influencing user behavior, education, safety campaigns, and theoretical models for behavioral change
• Experimental methods in behavioral changing analysis
• Economic impact of road accidents
• Classification and evaluation of road safety measures
• Prediction of road accidents in urban and interurban road network
• Reduction of road accidents in road segments and junctions.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*	see table below

Activity	***Semester workload***
Lectures	52
Individual study	78

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	Course total (26 hours workload per ECTS credit): ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

ATTACHED BIBLIOGRAPHY

- **[in Greek] Κώδικας Οδικής Κυκλοφορίας (Κ.Ο.Κ.), Υπουργείο Μεταφορών Επικοινωνιών, Αθήνα, 2009, ISBN: 978-960-337-071-0.**
- **[in Greek] Παυλίδης, Θ.Π. (2004). Η συμβολή του ανθρώπου στην οδική ασφάλεια. Ζήτη Πελαγία Σια Ι.Κ.Ε., ISBN: 960-431-939-6.**
- **[in Greek] Φραντζεσκάκης, Ι.Μ., Γκόλιας, Ι.Κ. (1994). Οδική ασφάλεια. Α. ΠΑΠΑΣΩΤΗΡΙΟΥ ΣΙΑ Ι.Κ.Ε., ISBN: 978-960-7510-06-8.**
- **Highway Safety Manual (HSM), American Association of State Highway Transportation Officials (AASHTO), 2010.**

14.8.17. Environmental Impact Assessment Studies for Transport

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ015	**SEMESTER**	8th
COURSE TITLE	Environmental Impact Assessment Studies for Transport		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing the course students should be able to • Recognize the institutional framework for the protection of the environment in Greece and the stages of environmental impact assessment studies execution of transport infrastructure systems, • Recognise the basic units of road construction environmental impacts, • Address issues in road traffic noise and vibrations, air pollution, aesthetic pollution, anti-pollution measures and environmental monitoring programs.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

• Institutional framework for the protection of the environment in Greece • Execution stages for environmental impact assessment studies for road transportation projects • Basic evaluation sections for environmental assessment and impacts for road transportation projects • Land uses, natural and human ecosystems • Road traffic noise and vibrations • Measurement and evaluation of continuous noise level from road operation • Methods of road traffic noise prediction and evaluation (construction – operation phases) • Anti-noise barriers • Air pollution, air pollutants from road traffic • Emission, pollution concentration, pollution dispersion and parameters • Road traffic noise and air pollution monitoring systems • Metrological equipment for acoustic measurements.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	*Semester workload*
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

Vogiatzis, K. (2014). Environmental Policy and Implementation Framework. Simmetria Editions, ISBN 978-960-266-390-5 [in Greek].

Tzika-Chatzopoulou, A., Chaikali, S., Vogiatzis, K. (2010). Protection of the Greek Acoustic Landscape. Papasotiriou Editions, ISBN: 978-960-7182-56-2 [in Greek].

14.8.18. Water Resources and Flood Risk Management

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ009	**SEMESTER**	8th
COURSE TITLE	Water Resources and Flood Risk Management		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Gain a deep understanding of the fundamental concepts of water resources management.
- Comprehend and infer the natural processes of flood phenomena and methods for quantifying their characteristics.
- Calculate the hydrological design of water resources utilization projects.
- Analyze and solve a multi-purpose hydro-system management problem.
- Formulate and solve optimization problems of water distribution systems using classical and evolutionary algorithms.
- Evaluate, assess, and manage flood risk.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*......*
Production of new research ideas	*Others...*
	....

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking.

SYLLABUS

Course Description: The course aims to provide students with the necessary theoretical background for the course 'ΥΔΡ009 Water Resources and Flood Risk Management'. It includes the essential material for understanding: (a) the principles of water resources management within the framework of sustainable development, (b) computational methods and analysis tools that support the design and optimal operation of hydro-systems under uncertainty, and (c) computational and analytical techniques and methodologies for the estimation and management of flood risk.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual assignment (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

Activity	***Semester workload***
Lectures	36
Practice/exercises	16
Project(s)	10
Educational visit	
Individual study	
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

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14.8.19. Renewable Energy Sources (geothermal, hydroelectric works)

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ010	**SEMESTER**	8th
COURSE TITLE	Renewable Energy Sources (geothermal, hydroelectric works)		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- understand the basic principles of energy technologies and energy mix, and determine the energy balance
- identify and estimate geothermal energy potential
- calculate hydraulic losses of hydroelectric projects
- plan the general layout and siting of hydroelectric projects
- compose technical-economic reports/studies and explain the performance of geothermal energy exploitation systems
- evaluate the performance and functionality of small and large hydroelectric projects

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Research, analysis and synthesis of data and information
- Adaptation to new situations
- Decision making
- Individual work
- Work in an interdisciplinary environment
- Project planning and management
- Respect for the natural environment
- Promotion of free, creative, and inductive thinking

SYLLABUS

The course aims to provide students with the basic theoretical background for the course 'ΥΔΡ010 Renewable energy sources (geothermal, hydroelectric projects)'. It includes the necessary material for understanding: (a) the existence of geothermal energy sources as well as the calculation of the required technical infrastructure for their utilization and (b) the preliminary design of small and large hydroelectric projects.

Content of lectures:

- Energy. Basic principles of energy technologies. Energy mix. Renewable energy sources. Electricity balance. Temporal variation of consumptions. Energy production distinction.
- Introduction to geothermal terminology. Heat sources inside the Earth. Types of geothermal fields and potential uses. Advantages and disadvantages.
- Hydrothermal deterioration. Sampling of geothermal fluids. Stages of geothermal research.
- Usage of geothermal energy. High and low enthalpy geothermal energy (production of fluids and energy, networks, impact). Technical problems in the exploitation of geothermal energy.
- Financial – Technical elements of geothermal applications. Utilization of geothermal energy in Greece. Locating and evaluating geothermal energy sources.
- Principles and fundamentals of hydroelectric technology. Hydraulic losses. Types of turbines and their mechanical characteristics. Hydroelectric projects (water intakes, intake pipes, generating stations, escape pipes, spillways, gate barriers).
- Preliminary design of large hydroelectric projects (general layout, technical parameters, environmental issues, operation, and optimization).
- Small hydroelectric projects (technology, design, water abstractions, pipelines, reservoirs, environmental issues, hydrological planning).

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on e-learning. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	36
Practice/exercises	16
Project(s)	10
Educational visit	
Individual study	
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual work (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

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14.8.20. Wave Mechanics and Offshore Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ011	**SEMESTER**	8th
COURSE TITLE	Wave Mechanics and Offshore Structures		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the student will be able to: describe and select appropriate (depending on the physical design problem) theories and principles for linear and non-linear ocean waves and understand the main characteristics of the offshore structures wave-structure interaction mechanism.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
	Respect for difference and multiculturalism

Adapting to new situations *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking.

SYLLABUS

The course aims to provide students with the basic theoretical background for the course. Includes the necessary material for the understanding of: (a) linear and non-linear theories of wave mechanics, (b) the calculation of hydrodynamic loads on slender members and massive bodies and (c) of analysis and design of mooring cables and fluid transfer pipelines in marine environment.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which includes: o Extended Response Theoretical Questions (Formative

Activity	*Semester workload*
Lectures	36
Practice/exercises	16
Project(s)	10
Educational visit	
Individual study	
Course total (26 hours workload per ECTS credit)	***130***

presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual assignment (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

ATTACHED BIBLIOGRAPHY

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14.8.21. Environmental Hydraulics

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ012	**SEMESTER**	8th
COURSE TITLE	Environmental Hydraulics		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course

PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Identify mathematical and analytical computational methods applied to hydraulic environment.
- Understand pollutant transport processes in hydro-systems and mathematical models of pollution.
- Examine wastewater dilution (in time and space) under various aquatic environmental conditions.
- Calculate pollutant concentration dispersed in a river, taking into account hydraulic interactions and processes.
- Explain turbulent mixing phenomena using dimensional analysis.
- Evaluate and design wastewater disposal projects in the sea.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking.

SYLLABUS

Course Description:
The course aims to provide students with the necessary theoretical background for the course 'ΥΔΡ012 Environmental Hydraulics'. It includes the essential material for understanding: (a) pollutant transport processes in hydro-systems, (b) hydraulic calculations of underwater sewage conduits, and (c) the description of turbulent diffusion in rivers and coastal areas.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>36</td></tr>
<tr><td>Practice/exercises</td><td>16</td></tr>
<tr><td>Project(s)</td><td>10</td></tr>
<tr><td>Individual study</td><td>68</td></tr>
<tr><td></td><td></td></tr>
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<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Evaluation Language: Greek
Written Examination with Extended Response Questions (Formative and/or Conclusive)
Theory Assessment (80% of the final grade):
• Written progress exam (20% of the final grade) which includes:
o Extended Response Theoretical Questions (Formative and/or Inferential)
o Solving problems-exercises
• Final written exam (60% of the final grade) which includes:
o Extended Response Theoretical Questions (Formative and/or Inferential)
o Solving problems-exercises
Individual assignment (20% of the final grade)
This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website.
The outline is communicated orally to the students during the first lecture.</td></tr>
</table>

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9th Semester Courses

14.9.1. Coastal and Harbor Engineering

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	YΔP013		**SEMESTER**	9th
COURSE TITLE	Coastal and Harbor Engineering			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, students will be able to: • identify and describe marine hydraulic processes in the coastal area, • estimate wave propagation at the coastal front and distinguish wave processes in the coastal area • calculate the wave loadings on a vertical front and breakwaters with slopes and dimension these constructions
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and*   *Project planning and management*

information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking.

SYLLABUS

The course aims to provide students with the basic theoretical background for the core course 'YDR013 Coastal Engineering and Port Works'. Includes the necessary material for the understanding of: (a) the characteristics of marine hydraulic flow in a coastal area, (b) the complex phenomenon of coastal morphodynamics and the effect on coastal mechanics and (c) of the design of coastal and port projects.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions,*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which

Activity	***Semester workload***
Lectures	36
Practice/exercises	16
Project(s)	10
Educational visit	
Individual study	
Course total (26 hours workload per ECTS credit)	***130***

open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual assignment (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

ATTACHED BIBLIOGRAPHY

- [In Greek] Καραμπάς Θεοφάνης, Δήμας Αθανάσιος, Λουκογεωργάκη Ευαγγελία, ΑΚΤΟΜΗΧΑΝΙΚΗ ΚΑΙ ΛΙΜΕΝΙΚΑ ΕΡΓΑ, Εκδόσεις ΔΙΣΙΓΜΑ, 2020, ISBN: 978-618-5242-92-3. Κωδικός Βιβλίου στον Εύδοξο: 94690348
- [In Greek] Κουτίτας Χριστόφορος, Εισαγωγή στην παράκτια τεχνική και τα λιμενικά έργα, Εκδόσεις Ζήτη, 1994, ISBN: 960-431-289-8. Κωδικός Βιβλίου στον Εύδοξο: 11264
- [In Greek] Κρεστενίτης Ιωάννης, Κομπιάδου Κατερίνα, Μακρής Χρήστος, Ανδουλιδάκης Γιάννης, Καραμπάς Θεοφάνης, ΠΑΡΑΚΤΙΑ ΜΗΧΑΝΙΚΗ - ΘΑΛΑΣΣΙΑ ΠΕΡΙΒΑΛΛΟΝΤΙΚΗ ΥΔΡΑΥΛΙΚΗ, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", 2016 (1η έκδοση), ISBN: 978-960-603-253-0. Κωδικός Βιβλίου στον Εύδοξο: 320173
- [In Greek] Καραμπάς Θεοφάνης, Κρεστενίτης Ιωάννης, Κουτίτας Χριστόφορος, Ακτομηχανική – Έργα Προστασία Ακτών, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος", 2015, ISBN: 978-960-603-378-0

14.9.2. Construction Site and Machinery Management

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ017	**SEMESTER**	9th
COURSE TITLE	Construction Site and Machinery Management		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing this course students should be able to recognize and propose use of different types of construction machinery, to prepare construction site management plans, accurate takeoffs, productivity estimates as well as construction site safety plans.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Introduction to Construction Site and Machinery Management. Construction machinery (types of machinery, heavy equipment, cost and maintenance). Measured drawings and methods for as-built project costs, designing and dimensioning construction site layouts. Construction site organization. Legislative framework. Construction site safety plans, construction safety engineer. Main concepts and examples: Loader-truck combination, conveyor-belt system, calculation diagrams - Excavator-bulldozer combination. Rapid calculation methodology for performance evaluation - Cost estimation.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material

TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*		
	Activity	***Semester workload***
	Lectures	39
	Practice/exercises	13
	Project(s)	78
	Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) OR Final written exam (70%) + Optional individual assignment (30%). The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

ATTACHED BIBLIOGRAPHY

- [in Greek] Παντουβάκης, Π. Λαμπρόπουλος, Σ. (2012), Οργάνωση Εργοταξίων, Αθήνα, ISBN 978-960- 93-4005-2.
- [in Greek] Πολύζος Σερ. (2011), Διοίκηση Διαχείριση των Έργων [Νέα αναθεωρημένη Έκδοση], Εκδόσεις Κριτική.
- [in Greek] Πετροτσάτου Κ. Μαρινέλλη Μ. (2018), Δομικές μηχανές, λειτουργική ανάλυση και κοστολόγηση έργων Πολιτικού Μηχανικού, Εκδόσεις Κριτική, ISBN: 9789605862534.

14.9.3. Retrofitting and Strengthening of Existing Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ031	**SEMESTER**	9th
COURSE TITLE	Retrofitting and Strengthening of Existing Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course

PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=440

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:
1. To recognize the forms of failure in existing constructions
2. To understand the concepts of intervention, repair, strengthening, valuation and vulnerability of structures
3. To be able to choose the appropriate intervention strategy (materials/techniques) for an existing structure
4. To assess the load-bearing capacity of reinforced concrete structural elements
5. To use the Regulation of Interventions (KAN.EPE.) for the assessment of an existing structure and the selection of an appropriate intervention

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Introduction to the concepts of assessment and vulnerability of structures
• Strategies and design for seismic retrofit of buildings
• Overview of regulatory provisions and guidelines relating to interventions and strengthening of structures. Introduction to KAN.EPE. and Eurocode 8-3
• Estimation of the load-bearing capacity of Reinforced Concrete structural elements

• Materials and techniques for repair/strengthening (RC jackets, FRP etc.) • Introduction to inelastic methods of analysis of structures

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td colspan="2">Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td colspan="2"></td></tr>
<tr><td rowspan="11">TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Practice/exercises</td><td>26</td></tr>
<tr><td>Project(s)</td><td>20</td></tr>
<tr><td>Individual study</td><td>58</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td colspan="2">1. Assignment of tasks aimed at exploring the understanding of the concepts taught (30%).
2. Final written exam (in Greek) at the end of the semester (70%).
3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.</td></tr>
</table>

ATTACHED BIBLIOGRAPHY

Dritsos S., Repair and Strengthening of Reinforced Concrete Structures, 3rd ed., Patra, 2005 (in Greek)
Spyrakos K., Strengthening of Structures for Seismic Loads, TCG, 2004 (in Greek)
CEN, Eurocode 8: Design of structures for earthquake resistance Part 3: Assessment and retrofitting of buildings, 2005

14.9.4. Bridge Engineering - Road Construction Works

GENERAL

<table>
<tr><td>SCHOOL</td><td colspan="3">Engineering</td></tr>
<tr><td>ACADEMIC UNIT</td><td colspan="3">CIVIL ENGINEERING</td></tr>
<tr><td>LEVEL OF STUDIES</td><td colspan="3">Undergraduate</td></tr>
<tr><td>COURSE CODE</td><td>ΔΟΜ032</td><td>SEMESTER</td><td>9th</td></tr>
<tr><td>COURSE TITLE</td><td colspan="3">Bridge Engineering - Road Construction Works</td></tr>
<tr><td colspan="2">INDEPENDENT TEACHING ACTIVITIES
if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole</td><td>WEEKLY TEACHING HOURS</td><td>CREDITS</td></tr>
</table>

of the course, give the weekly teaching hours and the total credits		
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students are expected to:
1. Understand the basic principles governing the structural system, the formation of the superstructure and the foundation of bridges
2. Be familiar with the regulatory framework for bridge design
3. Know the types of bridges and their application field
4. Calculate the design actions for road bridges according to the Eurocodes (traffic loads, wind loads, seismic actions, etc.).
5. Model, analyze and dimension bridge piers and decks
6. Be able to design small-scale engineering works such as culverts, retaining structures, etc.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work

- Working in an interdisciplinary environment - Project planning and management - Criticism and self-criticism - Production of free, creative and inductive thinking

SYLLABUS

• Introduction to bridge engineering. Types of bridges. Construction methods • Elements of bridges. Abutments. Superstructure. Joints and bearings. Bridge foundations. • Design actions for road bridges in accordance with the Eurocodes. Seismic behavior of bridges. Basic design principles against earthquakes. • Design of bridge abutments (modeling, analysis, and dimensioning) • Design of bridge superstructures (modeling, analysis, and dimensioning) • Design of small engineering structures, culverts, retaining works, etc.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Project(s)	20
Individual study	58
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

Tegos I., Brigdes 2nd ed., Tsiartsianis publ., 2007 (in Greek)
Leonhardt F, Mönnig E. Vorlesungen über Massivbau—Teil 2: Sonderfälle der Bemessung im Stahlbetonbau. Dritte Auflage. Berlin Heidelberg: Springer; 1986.
Ermopoulos I., Steel and Composite Bridges, Kleidarithmos publ., 2000 (in Greek)

14.9.5. Elastoplastic Analysis of Structures

GENERAL

SCHOOL	Engineering			
ACADEMIC UNIT	CIVIL ENGINEERING			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	ΔΟΜ033	**SEMESTER**	9th	
COURSE TITLE	Elastoplastic Analysis of Structures			
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*			**WEEKLY TEACHING HOURS**	**CREDITS**
			4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course			
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)				

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:
1. understand the basic principles of the plastic behavior of truss structures
2. formulate and solve an elastoplastic loading problem of a medium and calculate stresses and strains
3. select a yield criterion depending on the structural material,
4. analyze collapse mechanisms in truss structures
5. determine manually or using computational tools the collapse load of frames

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*

Team work *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Elastic - elastoplastic analysis. Redistribution of forces. Ductility.
• Pure plastic bending. Bending with axial force. Interaction surfaces. Unloading. Influence of shear.
• Step by step elastoplastic analysis of statically determinate and indeterminate structures. Displacements.
• Application of the Principle of Virtual Work in elastoplastic analysis. Distribution of moments. Kinematically admissible mechanisms.
• Plastic limit analysis.
• Loads and collapse mechanisms of simple and frame structures.
• Concentrated - Distributed Plasticity. Yield criteria. Nonlinear analysis.
• Dynamic plastic analysis.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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Papadrakakis M., Statics Courses - Plastic Analysis of Truss Structures, Tsotras publ., 2013, ISBN 978-618-5066-02-4 (in Greek)
Jagabanduhu Chakrabarty: "Theory of Plasticity", 3rd Edition, Butterworth-Heinemann, 2006, ISBN: 9780750666381"

14.9.6. Bioclimatic Architectural Design

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ034	**SEMESTER**	9th
COURSE TITLE	Bioclimatic Architectural Design		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, each student is expected to be able to:
• Understand the basic concepts and strategies of energy-efficient design for buildings and describe relevant topics using the corresponding terminology.
• Distinguish, comprehend, and apply the principles of bioclimatic architecture and the fundamental design methodologies for passive buildings.
• Analyze the characteristics of a conventional building with the aim of its upgrading, evaluate options for integrating passive systems into it, such as: interventions in the building envelope (insulation, openings, roof), transformations of the layout, adoption of sustainable materials, environmental interventions. Propose smaller or larger-scale interventions in a well-documented way, towards upgrading.
• Create and compose, from the initial stage to a design level of scales 1:100-1:50, a small-scale building (residence) using the tools, techniques, and methods of energy-efficient design for buildings, while considering the surrounding area of the building as well.
Prerequisites for the course include knowledge of design principles (Drawing and Computer Aided Design (CAD)) and minimum prior experience in architectural design (covered by the Department's Curriculum).

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Working independently
_Team work
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Criticism and self-criticism
_Production of free, creative and inductive thinking

SYLLABUS

The course introduces students to energy-efficient design for buildings, with an emphasis on the ‘passive building’ and the implementation of soft technology applications within the context of sustainability for contemporary building constructions. The aim is for students to acquire knowledge on the basic theory of bioclimatic architectural design and the upgrading of conventional buildings, thus gradually become capable of designing bioclimatic building structures themselves using all the design methodology provided. Additionally, be able to make corrective interventions (upgrades) to existing buildings towards the same direction (low environmental impact, resource efficiency, sustainability). The course includes theoretical lectures and exercises (practice), short or extensive assignments that promote creative thinking (analysis synthesis) as well as design projects; all fostering active student participation in the course.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The final evaluation is composed of marks collected from different parts of the teaching process, as follows: A. Written examination (theory part, end of semester): 50% of the final grade B. Examination by design (design part, end of semester): 20% of the final grade C. Quality of exercises, assignments and design projects developed during the semester participation in the course procedures (i.e. oral participation, meeting deadlines for handing in work): 30% of the final grade. The evaluation criteria are listed in the introductory handout of the course, which is posted on the e-learning platform in the beginning of the semester and is also distributed and presented to the students during the 1st class meeting.

Activity	*Semester workload*
Lectures	
Practice/exercises	
Project(s)	38
Individual study	40
Course total (26 hours workload per ECTS credit)	***130***

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_Andreadaki – Chronaki, Eleni, 2017. Bioclimatic Design: Climate Change – Environment – Sustainability (2nd edition). Thessaloniki: University Studio Press Editions [in Greek].
_Papadopoulos, Michalis Axarli, Cleo, 2015. Building Physics and Passive Solar Energy Building Systems. Thessaloniki: Kyriakidis Editions [in Greek].
_Papamanolis, Nikolaos, 2015. Building physics and principles of buildings environmental design. [e-book] Athens: Association of Greek Academic Libraries (Kallipos). Available at: http://hdl.handle.net/11419/5407 [in Greek].

14.9.7. Building Documentation, Rehabilitation and Reuse.

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ035	**SEMESTER**	9th
COURSE TITLE	Building Documentation, Rehabilitation and Reuse.		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing this course students should be able to describe main contemporary trends concerning the restoration and reuse of buildings, to recognize and analyze past construction activities, to select and implement, based on evidence, the optimal methodology for building and architectural documentation, manage a range of theories and methods for the documentation, pathology and representation of the original form, to be capable of applying (creating, designing) these representations in an evidenced and scientifically sound manner, to evaluate on-site studies, as well as documentation and pathology representations, with the aim of selecting and proposing evidence-based reuse solutions that are compatible with the identity and history of the building and the unique features of the surrounding area, to prepare all required technical reports and presentations, to collaborate and contribute as a member of multidisciplinary team in the preparation of comprehensive reports and presentations on the documentation, restoration, and reuse of buildings.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Respect for the natural environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

This is an introductory course on current theories and methods for studying historical buildings and architectural complexes, with the aim of developing critical thinking in decision-making regarding their management. Special emphasis is given to the method of Architectural Documentation as a means of recording and documenting existing structures for restoration and reuse purposes.
Lectures: Main concepts, definitions, terminology, general principles, legislation, scientific ethics regarding interventions in preserved and non-preserved structures, the concept and significance of monuments and their surrounding environment, contemporary perspectives and examples of interventions in buildings with heritage value. Focus on implemented studies of restoration and reuse of buildings and architectural complexes.
Project: Theories and methods for approaching buildings and architectural complexes requiring documentation and restoration. Analysis of information retrieval methods through literature and on-site research. Architectural documentation methodologies depending on the object of study. Field exercise applying the aforementioned recording and documentation methodologies for buildings. Creation of pathology, typology, phase analysis and drawings of the buildings. Evaluation of information and drawings for the restoration of the buildings. Proposals for reuse in line with contemporary restoration theories.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, CAD software (AutoCAD), e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of*	- Final written examination on theory (50%) - Design examination (20%) - Project (assignments) (30%)

Activity	***Semester workload***
Lectures	
Practice/exercises	
Project(s)	
Individual study	
Course total (26 hours workload per ECTS credit)	***130***

evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

[In Greek]. Καραδέδος, Γ., Ιστορία και Θεωρία της Αποκατάστασης, Θεσσαλονίκη 2009.
[In Greek]. Νομικός, Μ., Αποκατάσταση - Επανάχρηση Ιστορικών Κτιρίων και Συνόλων, Θεσσαλονίκη, 1997.
[In Greek]. Καραμάνου, Ζ., Αποκατάσταση Επανάχρηση Κτιρίων και Συνόλων. Αναβάθμιση Προβληματικών Οικιστικών Περιοχών, Θεσσαλονίκη 1997

14.9.8. Composite Constructions

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ036	**SEMESTER**	9th
COURSE TITLE	Composite Constructions		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to:
- Understand the behavior of composite structures.
- Be familiar with the behavior of elements and members made of different structural materials.
- Calculate the combined ultimate limit state of steel and concrete in composite structures.
- Design 3 dimensional composite structures
- Distinguish between analysis methods and construction stages of composite structures.
- Calculate, check and dimension beams, slabs and columns of composite structures according to Eurocode 4

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

• Formation of buildings with mixed structural elements, operating principles of elements made from different materials: structural steel - reinforced concrete.
• Specifications of construction materials according to Eurocode 4.
• Composite beams: Determination of inertia magnitudes, analysis methods for ultimate limit states of failure and serviceability.
• Composite slabs: Analysis and dimensioning. Construction details.
• Composite columns. Types, determination of inertia magnitudes, plastic intensity magnitudes, interaction of moments - axial forces, bending checks, construction details.
• Behaviour of composite structural elements against fire.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*		
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice,*	***Activity***	***Semester workload***
	Lectures	52
	Individual study	78

fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***130***</td></tr></table>
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Assignment of tasks aimed at exploring the understanding of the concepts taught. 2. Final written exam at the end of the semester (in Greek). 3. Each student is given the opportunity to review their written exam and have their mistakes analyzed.

ATTACHED BIBLIOGRAPHY

Vagias I., Composite Structures from Steel and Reinforced Concrete, 3rd ed., Kleidarithmos publ., 2010 (in Greek)

14.9.9. Geotechnical Earthquake Engineering

GENERAL

<table>
<tr><td>SCHOOL</td><td colspan="3">Engineering</td></tr>
<tr><td>ACADEMIC UNIT</td><td colspan="3">CIVIL ENGINEERING</td></tr>
<tr><td>LEVEL OF STUDIES</td><td colspan="3">Undergraduate</td></tr>
<tr><td>COURSE CODE</td><td>ΓΕΩ013</td><td>SEMESTER</td><td>9th</td></tr>
<tr><td>COURSE TITLE</td><td colspan="3">Geotechnical Earthquake Engineering</td></tr>
</table>

<table>
<tr><td>INDEPENDENT TEACHING ACTIVITIES
if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</td><td>WEEKLY TEACHING HOURS</td><td>CREDITS</td></tr>
<tr><td></td><td>4</td><td>5</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</td><td></td><td></td></tr>
</table>

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No

COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, the student will be able to: • Recognize, understand and evaluate the basic soil and structural parameters related to the seismic behavior of geotechnical constructions. • Distinguish and comprehend various cases of seismic loading of geotechnical structures and calculate the respective stress and internal loading parameters. • Study shallow foundations, pile foundations and retaining structures under seismic loading based on the existing code regulations. • Synthesize solutions based on the knowledge acquired during the lessons, evaluate the requirements of the problem at hand, justify and support the proposed solutions and compare and choose the most appropriate approach between different alternatives.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: • Search, analysis and synthesis of data and information, with the use of the necessary technology • Decision-making • Working independently • Team work • Working in an interdisciplinary environment • Project planning

SYLLABUS

Study, analysis and design of geotechnical structures under seismic loading. Topics related to the seismic loading of soil, shallow foundations, pile foundations, retaining structures and other geotechnical constructions are examined, based on literature methods and the existing code regulations. Content of theory lectures and application exercises: • Soil characteristics and parameters during the soil dynamic response (based on experimental data, literature relationships and code provisions). • Review of technical seismology and soil dynamics topics. • Seismic design of shallow foundations.

• Seismic design of deep foundations (pile foundations). • Seismic design of retaining structures. • Seismic design of other geotechnical constructions (slopes, underground structures). • Special cases of seismic soil loading - liquefaction.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	(see table below)
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

Activity	*Semester workload*
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

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• [In Greek] Barnes G.E. (2014), "Εδαφομηχανική: Αρχές και Εφαρμογές (3η έκδοση)", Εκδόσεις Κλειδάριθμος, Αθήνα, ISBN: 978-960-461-578-0

14.9.10. Geotechnical Failures and Soil Improvement Methods

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ014	**SEMESTER**	9th
COURSE TITLE	Geotechnical Failures and Soil Improvement Methods		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the student will be able to:
• Recognize, understand and describe the basic forms of geotechnical failures and their causes.
• Identify and comprehend the physical and mechanical geotechnical parameters associated with potential failure and requiring improvement.
• Distinguish and evaluate the mechanism of the resulting improvement for each soil strengthening method quantitatively assess the achieved improvement.
• Design and/or synthesize solutions based on the knowledge acquired during the lessons, and evaluate the particular requirements of the problem at hand, in order to achieve the optimal result of soil improvement.

General Competences	
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:

- Search, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning

SYLLABUS

Study, analysis and design of measures for improving soils at risk of geotechnical failures. Issues related to soil failures (exceeding bearing capacity and/or settlements, liquefaction, etc.), slopes, underground structures, etc. are examined.

Content of theory lectures and application exercises:

- Basic characteristics and mechanical strength parameters of the soil.
- Presentation of basic types of geotechnical failures. Study of related soil properties, loading characteristics and causes leading to failure.
- Methods of improvement and strengthening soils under various risks (exceeding bearing capacity, exceeding settlements, soil liquefaction, landslides, slope failure, hydraulic excavation, etc.). Design, process, review of geotechnical parameters that are improved by each method.
- Detailed presentation and study of selected soil improvement methods based on literature methods and code provisions (soil compaction, soil replacement, soil reinforcement with grouting, micropiles, reinforced earth, geotextiles, soil preloading, drainage methods, gravel piles, etc.). Correlation with actual geotechnical failure cases addressed by each proposed improvement method.
- Monitoring the behavior of improved soils.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational*	

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48

visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***130***</td></tr></table>
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

ATTACHED BIBLIOGRAPHY

- [In Greek] Κωστόπουλος Σ.Δ. (2008), "Γεωτεχνικές Κατασκευές ΙΙ", Εκδόσεις Ίων, ISBN: 978-960-411- 657-7
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14.9.11. Computational Geotechnical Engineering

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ015	**SEMESTER**	9th
COURSE TITLE	Computational Geotechnical Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Recognize and understand the use of numerical methods and computer software in the study of the behavior of geotechnical structures.
- Distinguish and evaluate the basic parameters that govern the problem at hand and understand how to simulate them using specialized software.
- Study simple cases of geotechnical structures using specialized computer software.
- Evaluate the analysis results.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:

- Search, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning

SYLLABUS

The study of soil behavior and geotechnical structures using computer aided analysis. Specialized computer software (free and academic use) is presented for the analysis and computation of foundations, retaining walls, slopes, etc. The determination of the internal forces/stresses, the calculation of loading and the simulation of each examined case study in the provided software are also part of the course.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises using specialized software Written assignment (compulsory) which includes: • Processing and solving exercises-problems using specialized software • Assessment of understanding key concepts of the course

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- [In Greek] Κωμοδρόμος Α.Μ. (2008), "Υπολογιστική Γεωτεχνική Μηχανική: Αλληλεπίδραση Εδάφους-Κατασκευών", Εκδόσεις Κλειδάριθμος, ISBN: 978-960-461-201-7

14.9.12. Dams and Earth Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ016	**SEMESTER**	9th
COURSE TITLE	Dams and Earth Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g.*	**WEEKLY TEACHING**	**CREDITS**

lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits	**HOURS**	
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Recognize and understand the different types of dams and appreciate the importance of the required accompanying constructions.
- Evaluate the basic physical and mechanical parameters of soil materials and select those suitable for the construction of dams and related earth structures.
- Distinguish and evaluate the possible causes of failure in earth dams and propose solutions based on the knowledge acquired during the lectures.
- Conduct basic stability checks for the dam construction.
- Prescribe the fundamental parameters of the accompanying constructions for the proper operation of a dam.
- Propose an appropriate monitoring plan for assessing the dam behavior and evaluate the respective results.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
- Search, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning

SYLLABUS

Study of various types of dams and accompanying soil constructions (e.g. slopes) based on the respective code provisions. Development of topics such as underground water flow, soil permeability, excavation problems and their mitigation.

Content of theory lectures and exercises:
- Introduction to the subject - necessity of dams and earthworks.
- Presentation of different types of dams and accompanying structures - basic principles of earth dam construction - physical characteristics of utilized soil materials.
- Soil permeability, groundwater flow, water flow networks.
- Study of earth dams and accompanying structures based on literature and code provisions.
- Problems and causes of failure in earth dams and their mitigation – presentation of historic cases. Monitoring the dam behavior with instrumentation.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	30
Individual study	48
Course total (26 hours workload per ECTS credit)	***130***

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

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14.9.13. Soil – Structure Interaction

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΩ017	**SEMESTER**	9th
COURSE TITLE	Soil – Structure Interaction		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*

- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, the student will be able to:
- Recognize and understand the concepts related to the phenomenon of soil - foundation - structure interaction.
- Distinguish and evaluate the basic key parameters and soil and structural behavior that influence the interaction phenomenon.
- Comprehend the effects of interaction on the structural behavior and dynamic response.
- Study the influence of interaction in simple cases of foundations or in complex soil-structure systems using specialized software.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills:
- Search, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Project planning

SYLLABUS

Soil-foundation-structure interaction in above-ground and underground constructions. Concept of interaction under static and dynamic loading and examination of the phenomenon and effects of interaction in shallow foundations, embedded foundations, pile foundations and underground structures, based on state-of-the-art literature approaches and code provisions.

Content of theory lectures and application exercises:
- Introduction to soil – foundation – structure interaction. Case studies and examples.
- Soil and structural parameters affecting interaction under static and dynamic response.
- Foundation on compliant ground conditions - Winkler method.
- Pile-soil interaction under axial and lateral loading.
- Soil-structure interaction in underground constructions.
- Dynamic soil-foundation-structure interaction.
- Code provision related to the study interaction phenomena.
- Historical examples.
- Use of specialized software to employ for the simulation of interaction problems.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	**Activity** — **Semester workload** Lectures — 26 Practice/exercises — 26 Practice/exercises — 30 Individual study — 48 Course total (26 hours workload per ECTS credit) — ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final examination including: • Theoretical knowledge and judgment questions on course subjects • Solving problems-exercises Written assignment (compulsory) which includes: • Processing and solving exercises-problems • Assessment of understanding key concepts of the course

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- [In Greek] Κωμοδρόμος Α.Μ. (2008), "Υπολογιστική Γεωτεχνική Μηχανική: Αλληλεπίδραση Εδάφους-Κατασκευών", Εκδόσεις Κλειδάριθμος, ISBN: 978-960-461-201-7
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14.9.14. Design and Operation of Railway Transport Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ016	**SEMESTER**	9th
COURSE TITLE	Design and Operation of Railway Transport Systems		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole*		**WEEKLY TEACHING HOURS**	**CREDITS**

of the course, give the weekly teaching hours and the total credits		
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to collect data to design a railway transport system as well to define the level of service and safety provided and record the needs of an existing one

• To combine the previous data in order to define the parameters for the design or improvement of a railway transport system

• To implement the knowledge and data in order to calculate and design a new railway transport system and its components, to monitor, predict and manage the demand of an existing one

• To analyze components and operations that compose a railway transport system, clarify and classify them in terms of cost, quality and functional criteria.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	……
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:

_Search for, analysis and synthesis of data and information, with the use of the necessary technology

_Adapting to new situations

_Decision-making

_Project planning and management

_Respect for the natural environment.

SYLLABUS

Railway and its capabilities, the railway transport system and its historical evolution • Power vehicles, diesel and electric traction, • Wheel rail interaction • Railway track elements • Railway track infrastructure • Railway track design • Railway technical projects, railway tunnels, railway bridges, embankments, trenches, drainage, noise barriers and fences • Railway facilities, traffic signaling, railway electrification system, railway level crossings, railway lines, switches and crossings • Rolling stock, design, construction and operation of rolling stock, derailment of railway vehicles • High-speed trains, tilting trains, urban and suburban railway systems, rack railway • Elements of technical railway operators, train traffic management and traffic capacity • Elements of commercial rail operators, railway stations, organization and management of passenger and freight rail transport, mixed train traffic control and the effects in the design and operation of railway transport systems • Railway safety, European policy in rail transport, interoperability technical specifications.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

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14.9.15. Design and Operation of Sea Transport Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ018	**SEMESTER**	9th
COURSE TITLE	Design and Operation of Sea Transport Systems		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
		4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to recognize the basic principles and specifications for the design, organization and operation of sea transport systems • To acquire knowledge for the strategic and operational design of sea ports, combined transport and multimodal transport chain, as well as new technologies and intelligent systems in shipping and maritime transport • To acquire the ability to identify, analyze and interpret the necessary National, European and International legal framework.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Introduction to maritime systems • European policy on maritime transport • Maritime systems and technical terminology • Cargo and sea transport mode • Port organization characteristics: evolution and emerging trends • Demand and supply for shipping services • Port throughput, performance indicators and fares • Feasibility studies in maritime systems • Organization and management of ports and port facilities • Quality and safety management in maritime transport • Combined transport and multimodal transport chain • Short sea shipping and Motorways of the Sea • New technologies and intelligent systems in shipping and maritime transport.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational*	

Activity	***Semester workload***
Lectures	52
Individual study	78

visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Course total (26 hours workload per ECTS credit) | ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

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• Giannopoulos, G.A. (2005). Maritime Transport. Epikentro Editions. ISBN: 978-960- 6645-21-1 [in Greek].
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• Lindgren, J. F., Brynolf, S., Wilewska-Bien, M., Andersson, K. (eds), (2016). Shipping and the Environment. Improving Environmental Performance in Marine Transportation. Springer Berlin, Heidelberg. ISBN 978-3-662-49043-3.

14.9.16. Design and Operation of Air Transport Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ019	**SEMESTER**	9th
COURSE TITLE	Design and Operation of Air Transport Systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	

LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon completing the course students should be able to recognize the importance of air transport systems, national and international, as well as the procedures and systems necessary for their proper operation • To recognize and implement principles of air transport systems design, and know the air and ground infrastructure of air transport systems • To describe and implement elements of organization, management and administration of air transport systems • To acquire the ability to identify, analyze and interpret the necessary National, European and International legal framework.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Project planning and management _Respect for the natural environment.

SYLLABUS

Introduction to design and operation of air transport systems, • National and international air transport • Freedoms of the Air, monopoly and competition, liberalization, airline alliances and privatization • Organization and administration of airline companies and airports, financial data • Main elements for the study and the design of air transport systems

• Aircrafts and airports, Air Traffic Management • Airports: passenger terminals, freight terminals, airport access and safety • Helipads, Water airports.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

- Matsoukis, E. (2011). Airports. Simmetria Editions, ISBN: 978-960-266-399-4 [in Greek].
- Nikolaidis, Ath. F. (2017). Airports. Design and Construction. IKANIK I.K.E. Editions ISBN: 978- 960-91849-6-0 [in Greek].
- Profillidis, V. (2010). Air Transport and Airports. Papasotiriou Editions, ISBN: 978-960-7182-71-5 [In Greek].
- Ashford N.J. (2011). Airport Engineering: Planning, Design, and Development of 21st Century Airports. Wiley, HEAL-Link Wiley ebooks, ISBN: 9780470950074.

14.9.17. Transport policies

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ020	**SEMESTER**	9th
COURSE TITLE	Transport policies		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able
• to define the concept of transport policies,
• to recognize international practices and the characteristics of transport policies on a national and international level, as well as future prospects.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Project planning and management
_Respect for the natural environment.

SYLLABUS

Formulation of transport policies • European transport policies: a historical timeline • European policies in Trans-European/Pan-European Transport Networks • European policies for road, rail, air, maritime, and inland waterways transport • Control and monitoring of the implementation of European transport policies • International Organizations for policy making • National transport policies.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

• Thematic bulletins on the European Union, Transport and Tourism Policy. https://www.europarl.europa.eu/factsheets/el/section/198 [In Greek].
• European Union, Policy Areas of the European Union, Transportations. https://europa.eu/european-union/topics/transport_el [in Grrek].
• Transport Policy, A Journal of the World Conference on Transport Research Society (WCTRS), Elsevier. ISSN: 0967-070X. https://www.journals.elsevier.com/transport-policy
• Transportation Research Part A: Policy and Practice. Elsevier. ISSN: 0965-8564. https://www.journals.elsevier.com/transportation-research-part-a-policy-and-practice

• Pardali A. (2007). Ports economics and policies. Stamoulis Editions, ISBN: 978-960-351-689-7 [In Greek].
• Profillidis, V. (2010). Air Transport and Airports. Papasotiriou Editions, ISBN: 978-960-7182-71-5 [In Greek].
• Profillidis, V. (2016). Railway Science. Giahoudis Editions, ISBN: 978-960-12-1759-8 [In Greek].

14.9.18. Smart Cities, Infrastructure and Transport

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ021	**SEMESTER**	9th
COURSE TITLE	Smart Cities, Infrastructure and Transport		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completing the course students should be able to
•recognize the main elements of smart transportation, energy or infrastructure systems,
•implement principles of smart cities for the design of smart transportation, energy or infrastructure systems as well as principles of smart cities for data collection and assessment.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management* *Respect for difference and multiculturalism*

Adapting to new situations *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information, with the use of the necessary technology
_Adapting to new situations
_Decision-making
_Project planning and management
_Respect for the natural environment.

SYLLABUS

Sustainable cities
• Smart cities
• Examples of smart cities systems
• Algorithms and methods of smart systems for smart cities
• Smart infrastructures
• Vehicle-to-Vehicle communication
• Vehicle-to-Infrastructure communication.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Powerpoint presentations, e-learning platform for educational material
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exam (100%) which includes: - Open ended questions - Problem solving questions (exercises) The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.

Activity	***Semester workload***
Lectures	52
Individual study	78
Course total (26 hours workload per ECTS credit)	***130***

ATTACHED BIBLIOGRAPHY

• Leon-Garcia, A., Lenort, R., Holman, D., Staš, D., Krutilova, V., Wicher, P., Cagáňová, D., Špirková, D., Golej, J., Nguyen, K. (2016). Smart City 360°. Springer International Publishing, HEAL-Link Springer ebooks. ISBN: 9783319336817.
• Proceedings of the 4th International Conference on Smart City Applications, 2019, ACM Other conferences, Association for Computing Machinery, HEAL-Link ACM Proceedings, ISBN: 9781450362894.
• Skulimowski, A.M.J., Sheng, Z., Khemiri-Kallel, S., Cérin, C., Hsu, C-H (2018). Internet of Vehicles. Technologies and Services Towards Smart City, Lecture Notes in Computer Science. Springer International Publishing, HEAL-Link Springer ebooks, ISBN: 9783030050818.
• Zeng, X., Xie X., Sun, J., Ma, L., Chen, Y. (2017). International Symposium for Intelligent Transportation and Smart City (ITASC) 2017 Proceedings, Smart Innovation Systems and Technologies. Springer Singapore, HEAL-Link Springer ebooks, ISBN: 9789811035753.
• Mouratidis, A.K. (2008). Road Construction, The Management of Road Projects. University Studio Press, ISBN: 978-960-12-1759-8 [IN GREEK].

14.9.19. Hydraulic Structures Dams

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ014	**SEMESTER**	9th
COURSE TITLE	Hydraulic Structures Dams		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*

- *Descriptors for Levels 6, 7 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Determine the useful volume and structural characteristics of dams.
- Differentiate the most suitable arrangement (dam, hydraulic structures) in space based on selection criteria.
- Calculate design flood hydrographs and sediment volumes.
- Design the required special hydraulic structures.
- Develop hydraulic models and perform calculations for safety works.
- Evaluate hydraulic data and define the type of dam that should be selected.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking

SYLLABUS

Course Description:
The course aims to provide students with the necessary theoretical background for the course 'ΥΔΡ014 Hydraulic Structures Dams'. It includes the essential material for understanding theories and principles required for dam design at a pre-feasibility level, the selection of dam types, and hydraulic calculations of fundamental hydraulic structures in the relevant space.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography,*	

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Project(s)	10

tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Educational visit | Individual study | Course total (26 hours workload per ECTS credit) | ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual Assignment (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

ATTACHED BIBLIOGRAPHY

- [In Greek] Τσόγκας Χρήστος Ερ.,Τσόγκα Ελισάβετ Χ., Υδροδυναμικά Εργα - Φράγματα, Εκδόσεις Ίων, 2009, ISBN: 960-411-196-5. Κωδικός Βιβλίου στον Εύδοξο: 14865
- [In Greek] Μιμίκου Μαρία Α., Τεχνολογία Υδατικών Πόρων, Εκδόσεις Παπασωτηρίου, 2006, ISBN: 978- 960-7530-79-0. Κωδικός Βιβλίου στον Εύδοξο: 9780
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- [In Greek] Ι.Δ.Δημητρίου, Δ.Ι.Δημητρίου, ΠΕΡΙΒΑΛΛΟΝΤΙΚΗ ΥΔΡΑΥΛΙΚΗ, Εκδόσεις fountas, 2009, ISBN: 978960330675-7. Κωδικός Βιβλίου στον Εύδοξο: 4320
- [In Greek] Τσακίρης Γ., Υδατικοί πόροι : Ι Τεχνική υδρολογία και διαχείρηση των υδατικών πόρων, Εκδόσεις ΣΥΜΜΕΤΡΙΑ, 2012 (1η έκδοση), ISBN: 978-960-266-380-6. Κωδικός Βιβλίου στον Εύδοξο: 22771790

14.9.20. Irrigation and Drainage Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ015	**SEMESTER**	9th
COURSE TITLE	Irrigation and Drainage Systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

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

- Identify and describe the required land improvement projects.
- Explain the complex natural problem of water-soil-crops-atmosphere interaction.
- Calculate and design an irrigation network and its necessary structures.
- Adapt appropriate regulation and protection devices to the entire irrigation project.
- Evaluate and assess technical, environmental, and economic factors in the design of land improvement projects.
- Synthesize and propose optimal design solutions for irrigation projects.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

The course contributes to the following skills:
_Search for, analysis and synthesis of data and information
_Adapting to new situations
_Decision-making
_Working independently
_Working in an interdisciplinary environment
_Project planning and management
_Respect for the natural environment
_Production of free, creative and inductive thinking

SYLLABUS

Course Description: The course aims to provide students with the fundamental theoretical background for the course 'ΥΔΡ015 Irrigation and Drainage Systems'. It includes the necessary material for understanding theories and principles of (a) agricultural hydraulics, (b) quantitative assessment of irrigation water, (c) design and operation of land improvement projects, and (d) economic design of irrigation projects and networks.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>40</td></tr>
<tr><td>Practice/exercises</td><td>12</td></tr>
<tr><td>Project(s)</td><td>10</td></tr>
<tr><td>Educational visit</td><td></td></tr>
<tr><td>Individual study</td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total (26 hours workload per ECTS credit)</td><td>130</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Evaluation Language: Greek
Written Examination with Extended Response Questions (Formative and/or Conclusive)
Theory Assessment (80% of the final grade):
• Written progress exam (20% of the final grade) which includes:
o Extended Response Theoretical Questions (Formative and/or Inferential)
o Solving problems-exercises
• Final written exam (60% of the final grade) which includes:
o Extended Response Theoretical Questions (Formative and/or Inferential)
o Solving problems-exercises
Individual Assignment (20% of the final grade)
This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website.
The outline is communicated orally to the students during the first lecture.</td></tr>
</table>

ATTACHED BIBLIOGRAPHY

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• [In Greek] Τζιμόπουλος Χρήστος, Γεωργική υδραυλική, Τόμος ΙΙ, Συλλογικά αρδευτικά δίκτυα με καταιονισμό, Ζήτη, 1995, ISBN: 978-960-456-158-2. Κωδικός Βιβλίου στον Εύδοξο: 11424

14.9.21. Computational Hydrodynamics and Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ016	**SEMESTER**	9th
COURSE TITLE	Computational Hydrodynamics and Structures		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course, students will be able to: • Identify and describe the basic principles of finite volume numerical methods. • Distinguish the scope and applicability of turbulence models. • Develop simple computational codes to solve basic hydrodynamic use cases. • Understand and utilize open-source computational fluid dynamics software. • Construct computational models for calculating hydrodynamic loads on structures. • Evaluate computational techniques used by commercial or open-source hydrodynamic analysis codes.
General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information _Adapting to new situations _Decision-making _Working independently _Working in an interdisciplinary environment _Project planning and management _Respect for the natural environment _Production of free, creative and inductive thinking

SYLLABUS

Course Description: The course aims to provide students with the fundamental theoretical background for the course 'ΥΔΡ016 Computational Hydrodynamics and Structures'. It includes the necessary material for computational modeling of hydrodynamic interaction problems with structures and for students to gain a solid understanding of the physics of hydrodynamic interaction with structures, mathematical modeling of fluid flow, and computational simulation using appropriate software tools.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity,*	

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Project(s)	10
Individual study	68

etc. *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Course total (26 hours workload per ECTS credit) | ***130***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (80% of the final grade): • Written progress exam (20% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Individual Assignment (20% of the final grade) This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

ATTACHED BIBLIOGRAPHY

• [In Greek] Σούλης Ιωάννης, ΥΠΟΛΟΓΙΣΤΙΚΗ ΜΗΧΑΝΙΚΗ ΡΕΥΣΤΩΝ, Εκδόσεις ΧΑΡΑΛΑΜΠΟΣ ΝΙΚ. ΑΪΒΑΖΗΣ, 2008, ISBN: 978-960-99293-2-5. Κωδικός Βιβλίου στον Εύδοξο: 1100
• [In Greek] Versteeg H.K., Malalasekera W., Εισαγωγή στην Υπολογιστική Ρευστοδυναμική, Εκδόσεις ΤΖΙΟΛΑ, 2015 (2η έκδοση), ISBN: 978-960-418-343-2. Κωδικός Βιβλίου στον Εύδοξο: 50655976
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• Karimirad M., Michailides C., Nematbakhsh A., Offshore Mechanics: Structural and Fluid Dynamics for Recent Applications, Εκδόσεις John Wiley Sons, 2018, ISBN: 978-1-119-21662-9

14.9.22. Marine renewable energy systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΥΔΡ017	**SEMESTER**	9th
COURSE TITLE	Marine renewable energy systems		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	5

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* *Consult Appendix A* • *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area* • *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B* • *Guidelines for writing Learning Outcomes*
Upon successful completion of the course, students will be able to: • Determine the marine wave and/or wind resources in coastal and offshore areas. • Identify the structural elements of marine energy systems and assess their critical loading conditions (hydrodynamic, aerodynamic). • Calculate and evaluate energy production from marine energy systems. • Design the basic structural infrastructure of marine energy systems. • Develop and assemble computational models for the analysis of offshore wind turbines and wave energy converters. • Specify the requirements of computational codes for reliable coupled analysis of marine energy systems.

General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*	
Search for, analysis and synthesis of data and information, with the use of the necessary technology *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The course contributes to the following skills: _Search for, analysis and synthesis of data and information _Adapting to new situations _Decision-making _Working independently _Working in an interdisciplinary environment _Project planning and management _Respect for the natural environment _Production of free, creative and inductive thinking	

SYLLABUS

Course Description: The course aims to provide students with the fundamental theoretical background for the course 'ΥΔΡ017 Marine Renewable Energy Systems'. It includes the necessary material for understanding computational modeling, analysis, and design of energy systems in a marine environment (offshore wind turbines, wave energy converters), as well as computational simulation using appropriate software codes.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Learning process support (teaching and communication with students) through PowerPoint lectures, through the online course website, through the electronic e-learning platform and through additional electronic communication with students (online announcements and comments, emails, etc.). Additional material (lecture presentations, educational videos, useful sites, and scientific articles) posted on the e-learning platform. Teacher-student collaboration time either in person or via teleconference.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	see table below

Activity	***Semester workload***
Lectures	40
Practice/exercises	12
Project(s)	15
Individual study	63
Course total (26 hours workload per ECTS credit)	***130***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Evaluation Language: Greek Written Examination with Extended Response Questions (Formative and/or Conclusive) Theory Assessment (70% of the final grade): • Written progress exam (10% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises • Final written exam (60% of the final grade) which includes: o Extended Response Theoretical Questions (Formative and/or Inferential) o Solving problems-exercises Assignment Assessment (30% of the final grade): • Written assignment This course description text with the evaluation criteria is accessible to students in the Department's study guide (Department website) and on the course's website. The outline is communicated orally to the students during the first lecture.

ATTACHED BIBLIOGRAPHY

• [In Greek] Καραμπάς Θεοφάνης, Δήμας Αθανάσιος, Λουκογεωργάκη Ευαγγελία, ΑΚΤΟΜΗΧΑΝΙΚΗ ΚΑΙ ΛΙΜΕΝΙΚΑ ΕΡΓΑ, Εκδόσεις ΔΙΣΙΓΜΑ, 2020, ISBN: 978-618-5242-92-3. Κωδικός Βιβλίου στον Εύδοξο: 94690348
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• Chakrabarti Subrata K., Handbook of Offshore Engineering, Elsevier Ltd., ISBN 978-0-08- 044381-2, 2005.

10th Semester

14.10. Diploma Thesis

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΙΠ001	**SEMESTER**	10th
COURSE TITLE	Diploma Dissertation		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Diploma project		30
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	Prerequisite ECTS: Yes (180 ECTS) Prerequisite knowledge: Yes (prerequisite courses vary according to the specialization field).
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	http://civil.ihu.gr/pps.html

LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the Diploma Thesis, the student is expected to be able to:
• Apply scientific knowledge acquired during his postgraduate studies in Civil Engineering, with an emphasis on a chosen specialization field/ direction.
• Apply specialized scientific knowledge related to the Thesis' subject, studied experimentally / by research.
• Be familiar with the tools and methodology of scientific research and be able to use them in the future.
• Produce scientific papers and present them in public, aiming at disseminating knowledge and communicating with the scientific community.

General Competences *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* *Search for, analysis and synthesis of data and information, with the use of the necessary technology* *Adapting to new situations* *Decision-making* *Working independently* *Team work* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas* *Project planning and management* *Respect for difference and multiculturalism* *Respect for the natural environment* *Showing social, professional and ethical responsibility and sensitivity to gender issues* *Criticism and self-criticism* *Production of free, creative and inductive thinking* *……* *Others…* *…….*
The Diploma Dissertation contributes to the following skills: _Search for, analysis and synthesis of data and information, with the use of the necessary technology _Adapting to new situations _Decision-making _Working independently _Team work _Working in an interdisciplinary environment _Production of new research ideas _Project planning and management _Respect for the natural environment _Criticism and self-criticism _Production of free, creative and inductive thinking

SYLLABUS

The Diploma Disseration concerns the writing and public presentation of an extensive scientific paper that delves into specialized knowledge. The student studies bibliographically and experimentally or by research a specific topic that is part of one of the fields/ directions of Civil Engineering: Structural Engineering, Geotechnical Engineering, Transport Engineering or Hydraulics Engineering.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication via e-mail and Zoom platform. Use of the e-learning platform if needed.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity*** / ***Semester workload*** Tutorials: 60 Individual study: 470 Project(s): 250 Course total (26 hours workload per ECTS credit): ***780***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple*	The evaluation of the diploma dissertation is composed of the following: A. Quality of content and structure of the submitted scientific assignment (70%)

choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	B. Level of knowledge on the specific scientific topic and capability of answering the examination committee's questions during the presentation of the dissertation in a public audience. (20%) C. Consistency regarding the whole procedure (meeting deadlines, handing in interim deliverables etc.) and level of cooperation with the Supervisor during the development of the assignment (10%). The evaluation criteria of the diploma dissertation are clearly mentioned in the DIPLOMA DISSERTATION OUTLINE, posted on the Department's website, accessible to all students.

ATTACHED BIBLIOGRAPHY

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_Eco, Umberto, 2015. How to Write a Thesis. Translated by C. Mongiat Farina and G.Farina. [E-book]. The MIT Press.