INTERNATIONAL HELLENIC UNIVERSITY

SCHOOL OF ENGINEERING

ENVIRONMENTAL ENGINEERING

DEPARTMENT

ΤΜΗΜΑ ΜΗΧΑΝΙΚΩΝ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

ΔΙ.ΠΑ.Ε.

CERTIFIED STUDY PROGRAMME

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STUDY GUIDE

DEPARTMENT OF ENVIRONMENTAL ENGINEERING

«Thessaloniki», 2023

EDITING GROUP

Fani Antoniou

Associate Professor

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I.H.U. 2023

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FOREWORD (Welcome Note from the President of the Department)

Dear students,

On behalf of all members of our academic community, I welcome you to the Department of Environmental Engineering, in the School of Engineering, at the International Hellenic University. Our Department has a 63-year history in the field of Greek Higher Education, with more than 3600 graduates.

An Environmental Engineer is considered to be an engineer involved in protecting, improving the quality, and enhancing the environment, the environmental management of infrastructure, the management of air pollutants, and liquid, and solid waste, the remediation of polluted areas, the developing of innovative renewable energy technologies, water resource management, and hydraulic works.

Based on the legislation and the challenges posed by the adverse developments in environmental quality and severe threats to life, the Department's compelling purpose is to train engineers for the conservation, protection, and improvement of the environment with projects - structures - infrastructure, and actions aimed at the protection and management of the environment, its restoration, and monitoring in the context of sustainability, having examples of avoiding any activity that has an impact on the biosphere.

The five-year curriculum of the Department supports the training of Engineers capable of achieving the above objectives. The program considers current and future needs and trends concerning man, society, and the environment per the principles and requirements of European, international, and national legislation. At the same time, it emphasizes environmental assessment, improvement of the quality of the biosphere, climate change, design, construction, and management of structures based on environmental standards, renewable energy sources, and development of skills in the use of modern tools such as specialized computer programs to achieve the objectives. In addition, experimental research in modern materials, soil improvement, risk management, hydraulic flows, virtual reality, and biodiversity is carried out in the Department's laboratories. Student engagement in our undergraduate course can inspire and provide a springboard for postgraduate studies and doctoral theses.

All Department of Environmental Engineering members welcome you and are at your disposal for anything you may need concerning your studies.

The President of the Department

Evaggelos Keramaris
Associate Professor

1. THE INTERNATIONAL HELLENIC UNIVERSITY

1.1 General Information

The International Hellenic University (I.H.U.) based in Thessaloniki, was founded by article 1 of Law 3391/2005 (Aʹ 240) and 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 (Aʹ114).

With Law 4610/2019 (Government Gazette 70/Aʹ/7-5-2019) seven (7) Schools were established therein with corresponding Departments in each of them.

Besides, 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 University headquarters 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 Management Board, and
- the President of the Department

The Assembly of the Department is made up of the Educational Staff members of the Department ,the technical staff representatives, undergraduate and postgraduate students.
The Assembly and the President 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 Alexander Campus

FOUNDATION

The International Hellenic University was established by Law 3391/2005 (A' 240) and is a Public Law Entity, fully self-governing with its seat in Thessaloniki (Municipality of Thermi). The International Hellenic University (IHU) operates within the framework of Article 16 of the current Constitution and the laws governing higher education in the country. The State supervises and subsidizes it through the Ministry of Education and Religious Affairs.

According to Article 6 par. 1 of Law 4610/2019 "Synergies between Universities - TEI, access to higher education, experimental schools, GAK" (A' 70), the Technological Educational Institute of Central Macedonia (TEI of Central Macedonia), the Technological Educational Institute of Eastern Macedonia and Thrace (TEI of Eastern Macedonia and Thrace) and the Alexander Technological Educational Institute of Thessaloniki (ATEI of Thessaloniki) were abolished as independent legal entities and were incorporated into the IHU, which automatically assumed all rights and obligations of the TEIs, as their quasi-universal successor.

At the 12th/16-10-2019 Meeting of the Steering Committee of the I.H.U., the name "Alexander Campus" was approved for the former premises of the Alexander TEI of Thessaloniki Campus.

INFRASTRUCTURE

General

The IHU's privately owned facilities at the Alexander University Campus are located in Sindos, at the 15th kilometer of the Thessaloniki - Athens highway. The Alexander Campus occupies an area of 1,600 acres, where the campus buildings necessary for education (classrooms, laboratories, lecture halls) and other useful facilities such as a student residence, library, restaurant, farm, and car parking are arranged primarily by faculty.

Library

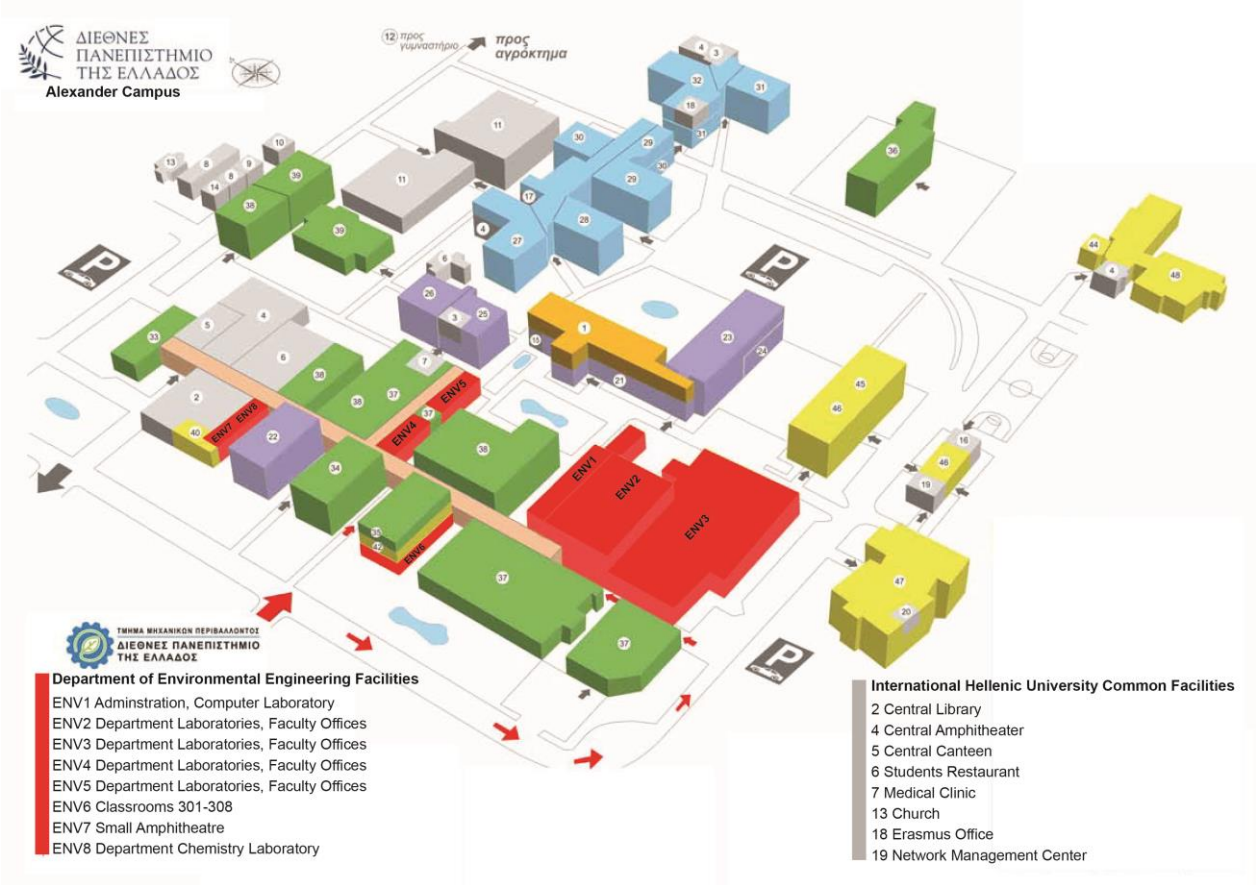
In the Alexander Campus there is a lending library with a large number of books and journals as well as a reading area which every student can use for individual study. The library has online access for searching books and journals. The electronic address of the library is http://www.lib.teithe.gr. It is open all working days of the year.

Access

Access to the IHU's Alexandria Campus by private car is easy by following the Thessaloniki - Athens highway, taking the exit at the 9th kilometer towards the industrial area of Sindos. The Alexander Campus is located 1 km after this turn on the right.

The Thessaloniki Urban Transport Organisation (O.A.S.TH.) serves the Alexander Campus with bus line No 52, which starts at the city's New Railway Station and ends at the former Alexander Technical University of Thessaloniki.

ALEXANDER CAMPUS MAP



2. THE CITY OF THESSALONIKI

2.1 Geographical and Demographic Information

The Prefecture of Thessaloniki is the largest in Macedonia and Northern Greece. Administratively it belongs to the Region of Central Macedonia and is identical to the regional unit of Thessaloniki. The Prefecture of Thessaloniki is located in central Macedonia and is bordered by the Thermaikos Gulf to the west and the Strymonikos Gulf to the east. In the central-northern part of the prefecture, there is the valley of Mydonia with Lake Koroneia (or Lake Agios Vasileiou or Lake Lagada), and a bit further east, Lake Volvi, the second largest lake in Greece.

Thessaloniki is the capital of the prefecture of Thessaloniki and the second-largest city in Greece in population. It is built amphitheatrically on the slopes of Kedrinos Hill and is surrounded to the north by the forest of Sheikh Su. Thessaloniki is located in the west of the prefecture of Thessaloniki and at the mouth of the Thermaikos Gulf. Thessaloniki is the most crucial transport hub of Northern Greece, as it connects motorways and railways to Europe, while its port creates a crossroad between Greece and the rest of South-Eastern Europe. In Thessaloniki, there is the industrial zone of the city in Sindos, and to the east are the areas of the airport, Thermi, and Panorama.

The Municipality of Thessaloniki has an area of 19.3 sq. km. The urban complex of Thessaloniki exceeds 150 sq. km. and continues to spread. The Municipality of Thessaloniki is Greece's second most populous municipality after the Municipality of Athens. The population of the urban complex is estimated at 788,191 inhabitants, according to the 2021 census. The people of the metropolitan area amount to 1.012.013 inhabitants, while that of the regional unit (former prefecture) is 1.110.912.

2.2 Historical data

The city of Thessaloniki was founded in 315 BC by Cassander, the successor of Alexander the Great. It was named after Thessaloniki, the half-sister of Alexander the Great and the wife of Cassander. At her birth, Thessaloniki was named after her father, Philip, as the former had just achieved a significant victory against the Thessalians. An important center for ancient Greek, Roman, and Byzantine culture, Thessaloniki counts monuments from across the entire spectrum of historical time.

Throughout history, Thessaloniki has been a cosmopolitan and economically prosperous city. Its greatest prosperity was during the Byzantine period. Merchants from all over Greece and other countries (such as Serbia and Bulgaria) flocked to Thessaloniki, giving it a rich commercial and cultural activity. But at the same time as material prosperity, the city was characterized by an important intellectual movement of philosophers, orators, and scholars comparable to that of Constantinople.

After the catastrophic fire of 1917 and until 1950, Thessaloniki was redesigned, and its image barely resembled its pre-fire image. The reconstruction of the city was based on a city plan by the French architect Ernest Hébrard commissioned by Eleftherios Venizelos and the blending of Asia Minor culture and the culture of central Greece. The plan, however, was finally implemented only on Aristotelous Street, with Byzantine-style buildings, arcades, and peristyles, and in the large squares: Eleftherias, Diokitirion, and Aristotelous.

In recent years the city's urban plan has been dramatically improved, especially with the opening of Kennedy Avenue. Modern Thessaloniki is built semi-circularly along the beachfront and amphitheatrically to a 2-4 km depth. A landmark year in the contemporary history of the city is 1978, when the devastating earthquake occurred, killing 45 people and causing significant damage to houses and monuments.

2.3 Useful links of transportation

Link to phone numbers of bus, taxi, ferries, airplanes, police, hospitals etc. https://thessaloniki.travel/el/chrisimes-plirofories/diefthynseis-tilefona/chrisima-tilefona/

Directions to Alexandrer University Campus by public transport

Bus No. 52 from Central Train Station to I.H.U Alexander Campus (Ν.Σ. ΣΤΑΘΜΟΣ – ΔΙ.ΠΑ.Ε.)

3. THE DEPARTMENT OF ENVIRONMENTAL ENGINEERING

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

The newly established Department of Environmental Engineering supports the completion of studies for students previously enrolled in the Department of Civil Engineering which was discontinued with the aforementioned law and included eight semesters of study.

HISTORICAL BACKGROUND

The Department of Environmental Engineering of the School of Engineering of the International Hellenic University has a 63-year history in Greek Higher Education, with more than 3600 graduates. The historical development of the Department from its foundation until today is as follows:

Year / Legislation	Evolution of Department
1959 LD 3971/1959	Establishment of the **School of Civil Sub-engineering**, supervised by the National Technical University of Athens, as a four-year course
1966 LD 4564/1966	Renamed to Thessaloniki **Higher School of Civil Sub-engineering (ΑΣΥΤΗ)**.
1970 LD 652/1970	Establishment of the **Centre for Higher Technical Education of Thessaloniki (KATE)** and establishment of the **Higher School of Engineering Technology (ASTEM). The Department operates independently as ASYTH.**
1973	Incorporation of ASYTH into KATE of Thessaloniki and renaming it into the **Department of Civil Engineering Technologists** with specializations in a) Structural Works οp b) Transportation and Hydraulic Works with three years of study.
1977 Law 576/1977	Establishment of the Centres of Higher Technical and Vocational Education (KATEE) belonging to higher education (3 years of study) which included **the Department of Civil Engineering Technologists**
1979 PD 479/1979	Definition of directions a) Structural Works, b) Transportation and Hydraulic Works with three years of study in the **Department of Civil Engineering Technologists**
1983 Law. 1404/1983	Establishment of Techoilogical Educational Institiues (TEI)
1984 MD E5/632 GG 99/B/24.02.84	Integration of the **Department of Civil Engineering Technilogists** in the TEI of Thessaloniki with two directions a) Strucutres, b) Transport and hydraulic works
1985 MD 561/27.11.85 GG 199/A/27.11.85	Renamed to the **Department of Civil Infrastructure Projects** with 8 semesters of study

2001 Law 2916/2001	Integration of the TEIs in Higher Education as one of its two pillars
2005 PD 106/2005 GG 142/A/23.06.05	Renaming of the TEI of Thessaloniki to Alexander TEI of Thessaloniki
2013 PD 82/2013 GG 123/3.06.13	Renaming to the **Department of Civil Engineering T.E.** with two directions a) Structural Engineering, b) Infrastructure Engineering
2019 Law 4610/2019 GG 70/A/7.05.19	Renaming of the Department to the **Department of Environmental Engineering** with the integration of the faculty members of the Department of Civil Engineering of A.T.E.I. of Thessaloniki into the Department of Environmental Engineering of I.H.U.

PD= Presendential Decree, MD=Ministerial Decision, LD=Legislative Decree, GG = Government Gazette

The aim of the Department of Environmental Engineering is to train engineers for the preservation, protection and promotion of the environment with projects-structures-constructions and actions aimed at the protection and management of the environment, its restoration and monitoring in the context of sustainability, having examples of avoiding any action that has an impact on the biosphere. Thus, the aim of the Undergraduate Program of Studies (UPS) is to provide access to the necessary knowledge and skills required to solve contemporary environmental problems in the scientific field of Environmental Engineering.

The Department of Environmental Engineering is organized in the following Sectors:

- Sector A Built Environment and Management
- Sector B Hydraulic and Geo-environmental Engineering

Figure 1. View of the Envrionmental Engineering Department's Building

4. THE UNDERGRADUATE STUDY PROGRAM

4.1 The aims of the Undergraduate Study Program

The aim of the Undergraduate Study Program of the Department is to train engineers for the conservation, protection and enhancement of the environment with projects-structures-infrastrucutre, and actions aimed at the protection and management of the environment, its restoration and monitoring in the context of sustainability, having examples of avoiding any activity that has an impact on the biosphere.

Thus, the purpose of the Undergraduate Program of Studies (UPS) is to provide access to the necessary knowledge and skills required to solve contemporary environmental problems in the scientific field of Environmental Engineering.

In particular, graduates of the undergraduate program will be able to:

- analyse and design sustainable solutions to problems related to pollution reduction and prevention in water, air and soil
- work successfully with multidisciplinary teams aiming at sustainable development.
- take a leading role in environmental management because during their studies they will have acquired excellent technical and communication skills as well as an awareness of national and global environmental problems.

Environmental Engineers may be employed in the public or private sector, either independently or in collaboration with other engineering disciplines, on issues related to their scientific field. He/she may also work in the field of education for the teaching of environmental education courses.

The main Study Program areas include, among others: environemental protection, improvement of the quality and enhancement of the environment, environmental management of engineering works, management of gaseous pollutants, liquid and solid waste, remediation of polluted areas, development of innovative renewable energy technologies, management of water resources and hydraulic works.

4.2 Awarded title and level of qualification

The Program of Studies of the Department ensures that graduates are awarded a 1st Cycle of Studies (Bachelor's degree), Level 7 of the National and European Qualifications Framework. Name of the qualification: ENVIRONMENTAL ENGINEER.

4.3 Career Prospects for Graduates

Environmental protection and waste management impact human health and ecosystem quality, requiring cooperation between different sectors to define effective responses and solutions. The continuing growth of the world population, which requires ever more resources, the failure to manage environmental protection properly, and the improper management of waste are creating major environmental problems. The Environmental Engineer is crucial in addressing these significant and pressing environmental issues. The distinguishing feature of Environmental Engineers is the range of subjects they cover and their balance between environmental problems and improving the quality of life of people. This feature makes the study of

Environmental Engineering highly attractive on the one hand. On the other hand, their career path has a vast range of options and possibilities.

What is in effect is that an Environmental Engineer has the following professional rights:

1. Topographical mapping of existing buildings other than special use buildings, monuments, declared listed buildings, protected settlements and ensembles.
2. Preparation of studies on the location of buildings, facilities, and activities of businesses, particular uses, and organized receptors, and preparation of master plans.
3. Preparation of spatial development studies (local and regional) and operational programs.
4. Preparation of studies on hydraulic projects (land reclamation, dams, water supply, drainage) and water resources management.
5. Preparation of hydrogeology and groundwater studies.
6. Management and assessment (land and other property values, vulnerability, risk).
7. Conducting chemical studies and research.
8. Conducting chemical and chemical engineering studies on projects, facilities, and products.
9. Carrying out physicochemical and microbiological analyses and managing testing laboratories.
10. Carrying out studies on the plumbing of buildings.
11. Design of water collection, treatment, and supply facilities.
12. Design of wastewater treatment plants.
13. Design of waste and material collection, treatment, and disposal facilities.
14. Design studies for storage facilities for hazardous materials to preserve fragile products.
15. Design of energy efficiency, upgrading, and energy saving studies for building envelopes.
16. Energy audits/inspections.
17. Management of energy resources and use of renewable energy sources.
18. Management of energy systems and energy saving systems.
19. Preparation of Environmental Impact Studies and Strategic Environmental Assessments.
20. Environmental restoration studies for abandoned mining, metallurgical, and other industrial sites.
21. Preparation of the environmental monitoring program per the Environmental Conditions of projects and activities.
22. Preparation of Environmental Rehabilitation studies.
23. Development and design of environmental and energy management systems.
24. Management of environmentally sensitive areas or areas of particular ecological interest and aesthetic beauty.
25. Development of environmental audit systems (Eco audit).

26. Development of environmental monitoring models.
27. Preparation of studies of Horticultural Landscaping and studies of Greenery Projects.
28. Implementation of industrial/energy project studies.
29. Preparation of forestry studies.
30. Preparation of studies and issuing certificates of control of disinfection and insecticide control of public and private premises.
31. Preparation of studies for rehabilitation following industrial accidents and related disasters (e.g., soil and groundwater decontamination, etc.).

By the decision of the Ministry of Infrastructure, Environmental Engineers can be awarded a Category 13 - Hydraulic Works license. By this decision, concerning Public Works and Projects, the holders of a Diploma in Environmental Engineering may be registered as a designer in the following design categories of the Ministries of Development, Competitiveness, Infrastructure, Transport, and Networks:

- Cat. 27 - Environmental Studies
- Cat. 13- Hydraulic Projects

In addition, they may also register as a contractor in the Construction Experience Register (CER) of the same Ministry. If the Graduate Environmental Engineer has registered at the Technical Chamber of Greece (TEE) with a Chemical Engineering specialty then he can register in the following categories of CER:

- Industrial Energy Projects premises.
- Water, Liquid, Solid & Gaseous Wastewater Treatment & Treatment Projects
- Landscaping Projects

If the Graduate Environmental Engineer has registered at the TEE with a Civil Engineering specialty, then they may register in the following categories of the MEC:

- Hydraulic Works
- Water, Liquid, Solid & Gaseous Waste Water, Liquid, Solid & Gaseous Waste Treatment Projects
- Greenery Projects

The professional rights for the graduates of the Department of Envrionmental Engineering are awaited from the Ministry of Education.

5. INFORMATION on the CURRICULUM of STUDIES

5.1 Duration of Studies

The first cycle of studies in the Department of Environmental 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 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 the tenth that includes the preparation of a Diploma Thesis.

The maximum duration of study in a first-cycle study program constists of a minimum duration of eight (8) academic semesters for the award of the degree, increased by four (4) academic semesters. In a study program whose minimum time exceeds eight (8) academic semesters, the maximum duration of study is the minimum study time, increased by six (6) academic semesters. After the completion of the maximum period of study, the Board of Directors of the Department issues an act of deletion (article 76, par. 1, Law 4957/2022).

Students who have not exceeded the upper limit of study may, after applying to the Department Secretariat, interrupt their studies for a period of time that does not exceed two (2) years. The right to interrupt studies may be exercised once or partially for a period of at least one (1) academic semester, but the duration of the interruption may not cumulatively exceed two (2) years, in case it is partially provided. 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

Students are those who are registered in the Department of Environmental Engineering of the I.H.U. after passing the entrance exams to higher education, by transfer or by qualifying exams in accordance with the current regulations .

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

The passing candidates of the Panhellenic examinations who completed their registration through the electronic application of the Ministry of Education and Culture must carry out the 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

5.3 Academic Year Calendar

The academic year starts on September 1 every year and ends on August 31 of the following year. The educational work of every academic year is organized in two semesters, the winter semester and the spring semester, each of which comprises 13 weeks of teaching and one examination period (three weeks of exams). There are courses and workshops for which students are examined with progress tests and/or assignments; in this case, students do not take part in re-sit exams held in September.

For the Department of Environmental Engineering, the total number of semesters required to complete a course, as specified in the curriculum, is ten (10) semesters.

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.

Exact dates are determined by the Executive Committee. 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.

Every semester, and before the beginning of each exam period, students have the right and obligation to evaluate their courses and instructors, 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

Courses or exams are not held in the two months of summer holidays (July and August).

Holidays also 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

October 26: On the feast day of the Patron Saint of the city of the city of Thessaloniki St. Demitrios.

5.4 Specific Arrangements for Recognition of previous Studies

The provisions of Article 29 of the Internal Regulations of the International Hellenic University (Government Gazette B' 4889/06.11.2020) are followed for the admission of students to acquire a second degree by qualifying examinations. In particular, the three courses to be examined according to the decision of the Assembly of the Department of Environmental Engineering are Mathematics, Physics, Statics.

The syllabus of the examined courses is indicated in the course outline of this Study Guide with the following codes:

- Mathematics I (course code: 267-190101)
- Physics (course code: 267-190102)
- Statics I (course code: 267-190103)

Recognition/Accrediation of courses to students who entered by Admission Exams for Graduates

1. Students admitted to the Department of Environmental Engineering of the International Hellenic University may recognize courses that have been proven to have been taught and successfully examined in their department of origin at a domestic university, provided that these courses correspond to courses of the curriculum of the Department of Environmental Engineering, following a decision of the Department's Assembly. The total number of recognized courses may be at most 30% of the total number of courses in the Department of Environmental Engineering curriculum. The above shall also apply to students who transfer per the provisions in force at the time.

2. The decision of the Assembly of the Department of Environmental Engineering carries out the recognition of the courses. The students are exempted from the examination of the courses and/or laboratories and/or practical exercises of the curriculum of the host Department taught in the Department of origin and may join a different semester from the one of their registration.

3. For this purpose, the student submits an application with the required documents for the courses they request to be exempted from. To join a semester other than the semester of their registration, the student must submit a request immediately after registering for all the courses and required documents supporting the semester change.

4. In particular, the student submits a written request to the Departmental Secretariat together with a certificate of analytical grades certified by the Secretariat of the Department of origin, accompanied by the detailed syllabus of the courses taught and laboratories in which the student has practiced. The application and the attached documents are forwarded to the lecturer in charge, who recommends to the Departmental Assembly the recognition or not of the courses and/or laboratories and/or exercises to the applicant student.

5. The details for recognizing ECTS credits for Erasmus+ students are regulated in Article 20 of the IHU Internal Regulations (Government Gazette B' 4889/06.11.2020.)

5.5 Course declaration - Renewal of registration

Registration Procedure

Students at higher education institutes are those who are enrolled in them after passing the Panhellenic Examinations or after transfer or classification, according to the applicable provisions. A student who is registered and attending courses at a higher education institution may not simultaneously be a student at another higher education institution.

The student is obliged to renew their registration every semester. The renewal is carried out by submitting a course declaration following an announcement by the Department, which is posted on the website www.env.ihu.gr. The submission of a course declaration is made electronically by a specified date.

Course declaration procedure

The courses of the Department of Environmental Engineering undergraduate program are listed in the Study Guide. Students can plan their study program for each academic semester by declaring the courses they wish to attend. The course declaration is submitted by all students enrolled electronically through the University's teaching support system. Students may register for courses in the semester in which they are enrolled and courses from previous semesters in the same term, subject to the conditions regarding credits listed below. Students are entitled to attend and take examinations only for their declared courses. Students who do not submit a declaration for a semester may not participate in or take an examination in any course for that semester.

Course Credits (ECTS)

Each course is assigned a number of credits depending on its difficulty level. The total number of credits for each semester is thirty (30). The preparation of the thesis corresponds to thirty (30) credits. The minimum number of credits students must accumulate to complete their studies is 300.

The maximum number of credits that can be declared by each student of the Department of Environmental Engineering per semester is determined as follows:

- Students in their 1st and 2nd semesters register for courses up to 30 ECTS.
- Students in their 3rd to 8th semesters may register for courses up to 50 ECTS.
- Students in their 9th to 10th semesters may register for courses up to 80 ECTS.
- Students beyond the 10th semester of study may register for courses up to 80 ECTS.

The maximum number of credits that can be declared by each student per semester may be modified by a decision of the Departmental Assembly.

5.6 Academic ID- Student pass

Since 09/24/2012, undergraduate, postgraduate and doctoral students of all Universities in the country can electronically apply for the issuance of their academic identity card

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

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

5.7 Teaching Aids and Resources

The educational work is supported by the corresponding coursebooks, which are provided free of charge to the students, through the Electronic Integrated Book Management Service (Eudoxus). Students,after submitting the electronic declaration of courses each semester, also make the corresponding declaration of books on the web portal of the "EUDOXUS" system (http://eudoxus.gr/), with which they declare the coursebooks they wish to receive.

For a student to be able to declare the textbooks, their username and password are required, which are issued by the Department's Secretariat and are also used for other electronic services of the Institution. The student enters the main web page of the Central Information System (CIS) from where they are authenticated. There they are informed about the approved textbooks of the Department's courses and select those they are entitled to (one textbook per course for which he has registered). The instructor of each course has already proposed one or more textbooks suitable for the study of the course. Then, the student receives directly from the CIS an SMS and an e-mail with the code PIN, with which they get the selected textbooks either from the Library of the Alexander Campus or from another contracted bookstore that will be indicated to them or by any other procedure that will be decided by the Ministry of Education and the Eudoxos service (e.g. (e.g., by courier services), on working days and hours, on presentation of their identity card.

5.8 Course of Study

Curriculum requirements:

Duration of study: 5 years / 10 semesters. The academic year begins on 1 September each year and ends on 31 August of the following year. Each semester consists of 13 weeks of teaching. The courses in the curriculum are divided into nine semesters, with the 10th semester devoted to preparing the Diploma Thesis.

The Study Program supports 54 courses of which 48 are compulsory core courses, 6 are optional compulsory courses.

300 credits distributed as follows: 270 credits from 54 courses, of which 48 are compulsory, and 6 are electives (out of a total of 31 electives). 30 credits after successful completion and public support of the thesis.

The educational process of each course includes face-to-face teaching of the course. Information and Communication Technologies (ICT) are used where and when conditions require it. Teaching notes are given in electronic form (Use of ICT in teaching, Use of ICT in communication with students).

Teaching can be organized by: Lectures, Seminars, Laboratory Exercises, Study & Analysis of Literature, Study visits, Project work, Writing papers/assignments, etc.

ECTS credits: Each course of the Department's Curriculum is characterized by a number of credits.

The ECTS credits, which are allocated to each course, are a measure of the workload required to complete the objectives of an Academic Program by each student

Grade Scale: Grading is expressed as a numerical scale from zero to ten (0 - 10), and five (5) is the minimum passing mark.

For the successful completion of a laboratory course or the laboratory part or practical exercises of a mixed course, the student must prepare assignments and/or take progress tests within the laboratory part or practical exercises of the course.

The grade of the laboratory or laboratory part or practical exercises of a mixed course shall be included in the final grade resulting from the combination of the laboratory and theoretical parts of the course.

The final theoretical course grade is derived from the written examination at the end of each semester.

The final grade for a course is obtained either from the written examination at the end of each semester (theoretical course) or from the combination of the laboratory part or practical exercises and the theoretical part of the course (mixed course).

5.9 Examinations

The examination periods are three (3) per academic year and last three (3) weeks each:

1. The January examination period takes place after the completion of the winter semester, with examinations of the courses taken during that semester.

2. The June examination period takes place after the completion of the spring semester.

3. The third examination period is in September, during which all courses registered during the previous academic year but not receiving a sufficient grade shall be examined.

During the examinations, students are tested orally or in writing on the entire syllabus of each course declared by the student and provided by the respective course outline. The written examinations for each course shall be conducted under the instructor's responsibility and shall not exceed three (3) hours in duration. Students taking the examination are provided with answer sheets by the Department's Secretariat. At the beginning of the examination, the invigilators will check the identity of the examinees.

A student who is found to be copying from books or notes or another student's work or conspiring with another student or other students, or interfering with the smooth conduct of the examination shall be immediately and irrevocably failed in that course if his paper is marked and initialed by the invigilator who made this finding. The matter is then referred to the Dean's Office of the Faculty of Engineering through the Departmental Assembly.

5.10 Bachelor's / Diploma Thesis

The purpose of the Dissertation is to allow the student to apply the knowledge acquired in a subject area of the Environmental Engineering curriculum that interests them and to help them develop compositional skills. As such, the dissertation topics can be theoretical or experimental research drawn from the broader subject area of Environmental Engineering. Sources of topics are the current scientific developments in the field of Environmental Engineering as presented in scientific journals, conference proceedings, collections, volumes, research activities of the Department, technological developments, as well as trends and developments in the construction and environmental sector. The completion of the Dissertation corresponds to thirty (30) ECTS credits.

The Thesis Regulations, posted on the Department's website, describe in detail the procedure to be followed by students.

5.11 Work placement (internship)

Although a compulsory internship is not included in the curriculum, it is an excellent opportunity for the Department of Environmental Engineering students to get acquainted with activities directly or indirectly related to their field of study. Considering the young age of the Department (the first entrants were in 2019) and the non-recognized professional rights, contact with the labor market becomes necessary for the latter to get to know the available human resources that will soon be called upon to man companies-organizations-businesses. On the other hand, it allows faculty members to connect with the industry and develop partnerships beyond the internship framework (e.g., at the research level). Only through the Erasmus program is there the possibility of subsidized participation in an internship abroad during (Traineeship) or immediately after completion of studies (After Placement).

5.12 Degree Grade - Declaration of Graduation

The diploma grade is derived from the following formula:

$$\frac{(B_1 * ΠM_1 + B_2 * ΠM_2 + \cdots\cdots\cdots\cdots B_{54} * ΠM_{54}) + (B_{ΔE} * ΠM_{ΔE})}{(270+30)}$$

B_1 = Grade of course 1

$ΠM_1$ = ECTS of course 1

B_2 = Grade of course 2

$ΠM_2$ = ECTS of course 2

B_{54} = Grade of course 54

$ΠM_{54}$ = ECTS of course 54

ΒΔΕ = Dissertaion Grade

ΠΜΔΕ = Dissertations ECTS

The diploma certifies the successful completion of the student's studies and indicates the degree to two decimal places. This grade shall be characterized in the order of succession as:

«Excellent» from 8,50 to 10

«Very Good» from 6,50 to 8,49

«Good» from 5,00 to 6,49

5.13 Graduate Certificate - Transcript of Records –Diploma Supplement

1. To obtain a diploma, the student must have successfully passed fifty-four (54) compulsory courses, of which 48 are core courses, and 6 are electives.

2. In addition, to become a diploma student, in the tenth semester, it is compulsory to complete a Diploma Thesis.

3. To receive the diploma, the student must accumulate a total of three hundred (300) credit hours (ECTS), of which two hundred and seventy (270) credit hours from the courses and thirty (30) credit hours from the Diploma Thesis.

In the undergraduate or postgraduate degrees awarded by the Department (diplomas, etc.), a Diploma Supplement is attached, which provides information on the nature, level, general framework of education, content, and status of the studies completed by the person whose name appears on the original of the degree, to which the Supplement is attached, in accordance with the Ministerial Decision Φ5/72535/B3/2006 (V' 1091), as in force. The Diploma Supplement does not make any evaluative judgments, and there are no statements of equivalence or proposals concerning the recognition of the qualification abroad.

The Diploma Supplement is issued automatically and without any charge in Greek and English. The original of the Diploma Supplement must meet the authenticity requirements for the degree awarded. It must bear the signatures of the President and the Secretary of the Department or their legal substitutes, respectively, and the seal of the Institution.

The Diploma Supplement is issued to graduates who have followed a program of study for which, by decision of the competent institution, ECTS credits have been awarded.

5.14 Digital Skills Certificate

For graduates of the Department who have successfully completed in four (4) different semesters any of the courses from the following table, a Certificate of Digital Skills may be awarded.

Code	Course Name	Semester
267-190104	Computer Aided Engineering Drawing	1st
267-190105	Informatics	1st
267-190204	Computer Modeling Applications for Engineers	2nd
267-190304	Project Management I	3rd
267-190401	Analytical Decision Making Methods	4th
267-190603	Geographical Information System	6th
267-190606	Environmental Informatics	6th
267-191012	Project Planning and Management Software Applications	7th ή 8th ή 9th
267-192001	Numerical Methods and Mathematical Models in Hydraulic projects	7th ή 8th ή 9th

6. STAFF OF THE DEPARTMENT

6.1 The Staff of the Department

The staff of the Department of Environmental 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 Environmental Engineering is staffed with 9 (D.E.P.) and 2 (E.DI.P.) members.

The members of theTeaching 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 of the EDUCATIONAL STAFF			
A/A	**FULL NAME**	**TITLE**	**SUBJECT AREA/ SPECIALTY**
	Anagnostopoulos Costas	Professor	Soil Mechanics
	Galinou-Mitsoudi Sofia	Professor	Oyster Fishery Management-Cultivation
	Konstantinidis Dimitrios	Professor	Design of reinforced concrete and application in construction
	Savvidis Yiannis	Professor	Coastal Engineering and Physical Oceanography
5.	Keramaris Evangelos	Associate Professor	Experimental Hydraulics of Open Conduits
6.	Mentzelou Paraskevi	Associate Professor	Environmental Informatics-Electronic Learning
7.	Antoniou Fani	Assistant Professor	Infrastructure Project Management
8.	Syrpi Marina	Assistant Professor	Applied Mathematics (Probability - Statistics)
9.	Leousidis Alexandros	Lecturer	Hydraulic works

TABLE of the Special Technical Laboratory Staff (E.TE.P.), Special Teaching Laboratory Staff (E.D.I.P.)			
A/A	**FULL NAME**	**CATEGORY**	**SUBJECT AREA/ SPECIALTY**
1.	Liolios Antonis	E.DI.P.	
2.	Mentekides Socrates	E.DI.P.	Geodetic & Photogrammetric Methods for Environmental Applications

TABLE of the ADMINISTRATIVE STAFF		
A/A	**FULL NAME**	
1.	Zelka Triantafyllia	Head of the Secretariat
2.	Gizaris Ioannis	Sectretary

Address:
Department of Envrionmental Engineering
Alexander Campus
57400, Thessaloniki, Sindos

Τηλ. : 2310 013934/5
FAX : 2310 791156
e-mail : info@env.ihu.gr
URL:
http://www.env.ihu.gr

6.2 Administration/Secretariat Office: Duties and working hours

The Department Secretariat is responsible for student and administrative matters.

Student services are provided on all working days, and 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 Envrionmnetal Engineering Building.

Student issues include:

- registration procedures
- keeping the students' records, which include their grades, registration renewals every semester, and information about scholarships,
- granting Certificates and Degrees,
- granting certificates for legal use,
- issuing paper forms required for the 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 those passing the qualifying exams in the Department of Environmental Engineering of the I.H.U., the following apply:

Registration Renewals - Course Declarations are carried out through the Electronic Secretariat at the beginning of each Semester, and for a period of approximately fifteen (15) days. Each student has his/her own personal code, obtained from the Department's Secretariat, with which s/he declares courses electronically.
After the lists of successful candidates in the National 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 our 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 for financial, social, health reasons, etc., as well as for the children of large families, unless otherwise specified by law.
- Enrolment of Higher Education Graduates, who succeeded in qualifying exams, held every year, at the beginning of December.

6.3 The Role of the Academic Advisor(Tutor)

The institution of the Academic Advisor (Tutor) has been implemented by the Department of Environmental Engineering for a long time. Each year, by decision of the Department, a member of the Teaching and Educational Staff is designated an academic advisor for every first-year student for information and guidance in study matters. The academic advisor informs the students about his/her role and invites them to an introductory meeting. Students are required and encouraged to communicate regularly with their Academic Advisor,discuss educational issues and utilize his/her knowledge and experience throughout all the years of their studies.

6.4 Evaluation of the Educational Process

The International Hellenic University's Quality Assurance Unit (MODIP-I.H.U.) conducts annual internal evaluations of all Undergraduate Programs of Studies so that through monitoring and corrective actions, the objectives set by its quality assurance system are achieved, resulting in continuous improvement of the programs.

The Department of Environmental Engineering prepares an annual internal evaluation report based on the Hellenic Authority for Higher Education (HAHE) standard. It aims to provide excellent quality studies by creating a supportive, friendly, and effective learning environment for its students. The strategy and policy of the Department are focused on achieving excellent scientific and pedagogical work through the continuous monitoring of its organization, implementation, and evaluation by both the students and the Department Assembly.

Student evaluation of the undergraduate and graduate study programs is done by completing questionnaires on the MODIPs electronic platform. Through the collection and processing of quantitative and qualitative data, such as those resulting from the questionnaires of the students for each course, but also from the attendance statistics of the Department of Environmental Engineering, it is possible to assess both the progress and the knowledge provided in all the courses offered. Students are encouraged to participate in the process actively. At the same time, lecturers are asked to regularly update the content and the exercises/subjects of the courses they teach to adapt to the new conditions of science and technology.

The external evaluation process of the Department of Environmental Engineering has been carried out but has yet to be completed to consider the external evaluation reports of the Department.

7. FACILITIES

7.1 Laboratory Spaces and Equipment

The Department of Environmental Engineering has laboratories with specialized equipment to meet the educational and research needs in the related fields. The laboratories and the summary of the subject matter per Sector are given below:

BUILT ENVIRONMENT AND MANAGEMENT	HYDRAULIC AND GEO-ENVIRONMENTAL ENGINEERING
Concrete and Built Environment The objective of the Lab is the experimental, theoretical, and applied investigation of concrete by conducting laboratory and on-site structural tests on elements and structures, as well as the study of contemporary trends in the mitigation of environmental impacts caused by and on the built environment due to climate change. (Lab area 170m^2)	**Hydraulic Projects and Environmental Engineering** Supports research and teaching in the academic subjects: theoretical, computational, and experimental hydraulics of open and closed conduits, irrigation projects, drainage projects, simulation of convection, diffusion, dispersion and pollutant process chemistry, design and management of water resource systems, coastal engineering, wave propagation, and oceanography. (Lab area 320 m^2)
Environmental Informatics and Virtual Reality Laboratory Research through virtual reality by developing scenarios and virtual tours in the fields of Environmental Engineering and user interaction. (Lab area 110 m^2)	**Geomechanics** Laboratory and on-site testing of rock and soil materials under various stresses and determination of their mechanical and physical properties necessary for the design of a technical project. (Lab area 170 m^2)
Organisation and Management of Sustainable structural and environmental projects Research in the fields of Project Management, Decision Making, Project Economic Analysis, Supply Chain, Quality Management, Risk Analysis, Contract Management, Contracts Management, Contracts Management, Claim Management, and Safety during Construction. (Lab area 60 m^2)	**Soil Mechanics** Laboratory testing of the mechanical strength and physical properties of soil samples, taking data to study soil behavior both during construction and after its completion. (Lab area 130 m^2)
Materials Laboratory testing of structural materials under stress, determination of mechanical strengths, such as tensile strength, compressive strength, torsion, or other physical properties such as hardness and brittleness. (Lab area 160 m^2)	**Environmental Chemistry** Research in the fields of chemical reactions, measurement of basic chemical parameters, investigation of environmental phenomena through known pollution incidents and their analysis. (Lab area 120 m^2)

Computer	ECOLOGY
For teaching courses requiring the use of computers. Department students can also use it to access the Internet and prepare assignments, projects, and theses. (Lab area 90 m2). Laboratory testing of structural materials under stress, determination of mechanical strengths, such as tensile strength, compressive strength, torsion, or other physical properties such as hardness and brittleness. (Lab area 160 m^2)	Research in the fields of biology and ecology related to the identification of organisms and their relationships in natural or artificial ecosystems and protected areas, biodiversity, environmental quality and sustainability. (Lab area 15 m^2)
Technical Drawing	**Geodesy**
With the objective of training students to acquire basic technical drawing skills including perpendicular projections, and axonometry. (Lab area 90 m^2)	The aim is to train students in the use of instruments and methods in the fields of geodesy, surveying, plotting, locating and navigation. (Lab area 60 m^2)

7.2 Teaching Classrooms

Historically, the Department of Environmental Engineering was among the first to be established at the Alexander Campus in Sindos, Thessaloniki. The facilities of the Department are located on the ground floor and on the first floor of the central building where the Secretariats are located. For the coverage of the teaching work, the Department has:

- Wing 300, which is accessible from the ground floor of the main corridor. In Wing 300, there are lecture rooms 301-302 (96 seats), 303 (50 seats), 304 (20 mobile lecture desks), 305-306 (104 seats), 307 (50 seats), and 308 (40 seats).
- The Small Auditorium with a capacity of 100 seats.
- Rooms within the laboratories, such as the Laboratory of Soil Mechanics (30 seats), Laboratory of Hydraulic Works and Environmental Engineering (30 seats), Laboratory of Geodesy (30 seats), Laboratory of Materials Strength (30 seats), Laboratory of Technical Design (20 mobile layouts), Computer Lab (20 PC workstations), Organisation and Management of Sustainable Engineering and Environmental Projects (15 seats).

7.3 E-Learning

The IHU has created an asynchronous Moodle learning platform to support the courses of the Department of Environmental Engineering (https://exams-sm.the.ihu.gr). Students can log in to the platform that contains educational material per course. The platform is also used for communication between students and teachers.

8. THE UNDERGRADUATE STUDY PROGRAM

The Undergraduate Study Programme of the Department of Environmental Engineering (summary tables with duration, courses, course characterisations – mandatory, core, general background, electives, special background, specialized general knowledge – hours of theory, practical exersices, laboratory, ECTS credits)

8.1 Table I. An Overview of the Undergraduate Study Program

Semester									ECTS	Semester	ECTS
1st	2nd	3rd	4th	5th	6th	7th	8th	9th		10th	
Mathematics I	Mathematics II	Hydraulic of Closed Pipes	Analytical Decision Making Methods	Geotechnical Works	Project Management II	Smart Cities	Physical Oceanography	Groundwater Hydraulics and Hydrogeolgy		UNDERGRADUATE THESIS	30
Physics	Strength of Materials	Soil Mechanics	Foundations – Supports	Solid and Waste Management	Bridge Engineering	Coastal Engineering	Environmental Impact Projects	Aquatic Ecosystems			
Structural Analysis I	Biology	Structural Analysis II	Earthquake Engineering	Reinforced Concrete I	Geographical Information System	Pollution and Pollution Control Technologies I	Pollution and Pollution Control Technologies II	Reinforced Concrete II			
Computer Aided Engineering Drawing	Computer Modeling Applications for Engineers	Project Management I	Open Channel Hydraulics	Geodesy	Hydrology	Liquid Waste Processing Management	Business Administration and Entrepreneurship	Elective 4th			
Informatics	Environmental Egineering Geology	Probability and Numerical Methods	Environmental Data Processing and Analysis	Research Methods	Sewage Systems and Calculation	Elective 1st	Renewable Energy Sources	Elective 5th			
Ecology	Environmental Chemistry	Environmental and Public Works Legislation	Experimental Soil Mechanics	Water Sysems and Water Treatment	Environmental Informatics	Elective 2nd	Elective 3rd	Elective 6th			
									270		

Mandatory Courses	*Elective Courses*	**Total Courses**
48	6	54

General background

Core (special background)

Speciality (Specialised general knowledge, skills development)

8.2 Table II. Elective Courses

ELECTIVE COURSES per SECTOR				
BUILT ENVIRONMENT AND MANAGEMENT		**Hours**		**Total Hours**
		Th	**Lab/Tut**	
267-191001	Risk Management	2	2	4
267-191002	Natural Disaster Management	2	2	4
267-191003	Natural Hazards	2	2	4
267-191004	Architecture of Physical and Structure Environment	2	2	4
267-191005	Energy Design of Buildings	2	2	4
267-191006	Building Materials and Indoor Environmental Quality	2	2	4
267-191007	Mathematics III	2	2	4
267-191008	Quality Management and Assurance	2	2	4
267-191009	Inspection, Maintenance and Rehabilitation of Stuctures	2	2	4
267-191010	Health and Safety at Work	2	2	4
267-191011	Art and Technology	2	2	4
267-191012	Project Planning and Management Software Applications	2	2	4
267-191013	Sustainable Development	2	2	4
267-191014	Environmental Road Construction	2	2	4
267-191015	Spatial and Urban Planning	2	2	4
HYDRAULIC AND GEO-ENVIRONMENTAL ENGINEERING		**Hours**		**Total Hours**
		Th	**Lab/Tut**	
267-192001	Numerical Methods and Mathematical Models in Hydraulic projects	2	2	4
267-192002	Environmental Geotechnical Engineering	2	2	4
267-192003	River Training	2	2	4
267-192004	Environmental Microbiology and Biotechnology	2	2	4
267-192005	Environmental Management of Ports and Coastal Areas	2	2	4
267-192006	Ecotoxicology	2	2	4
267-192007	Hydrodynamic Projects	2	2	4

267-192008	Land Reclamation	2	2	4
267-192009	Climate Change and Impact	2	2	4
267-192010	Management of Marine Protectied Areas	2	2	4
267-192011	Heat and Mass Transfer	2	2	4
267-192012	Photogrammetry - Remote Sensing	2	2	4
267-192013	Experimental Fluid Mechanics	2	2	4
267-192014	Unsteady Flows	2	2	4
267-192015	Experimental Rocks Mechanics	2	2	4
267-192016	Natural Artificial Ecosystems	2	2	4

8.3 Undergraduate Study Program per Semester

	Course Type	ENVIRONMENTAL ENGINEERING UNDERGRADUATE PROGRAMME	Hours		Total Hours	ECTS
			Th	Lab/Tut		
1st Semester						
267-190101	Background	Mathematics I	3	2	5	6
267-109102	Background	Physics	2	2	4	5
267-190103	Background	Structural Analysis I	2	2	4	5
267-190104	Background	Computer Aided Engineering Drawing	0	4	4	5
267-190105	Background	Informatics	1	2	3	4
267-190106	CORE	Ecology	2	2	4	5
				Total	**24**	**30**
2nd Semester						
267-190201	Background	Mathematics II	2	2	4	5
267-190202	Background	Strength of Materials	2	2	4	4
267-190203	CORE	Biology	2	2	4	5
267-190204	Background	Computer Modeling Applications for Engineers	2	2	4	5
267-190205	CORE	Environmental Egineering Geology	2	2	4	5
267-190206	CORE	Environmental Chemistry	3	2	5	6
				Total	**25**	**30**
3rd Semester						
267-190301	CORE	Hydraulic of Closed Pipes	2	3	5	5
267-190302	CORE	Soil Mechanics	2	2	4	5
267-190303	CORE	Structural Analysis II	2	2	4	5
267-190304	CORE	Project Management I	2	2	4	5
267-190305	CORE	Probability and Numerical Methods	2	2	4	5
267-**190306**	CORE	Environmental and Public Works Legislation	2	2	4	5
				Total	**25**	**30**
4th Semester						
267-190401	SPECIALTY	Analytical Decision Making Methods	2	2	4	5
267-190402	SPECIALTY	Foundations – Supports	2	2	4	5
267-190403	CORE	Earthquake Engineering	2	2	4	5
267-190404	CORE	Open Channel Hydraulics	2	3	5	5
267-190405	CORE	Environmental Data Processing and Analysis	2	2	4	5
267-190406	SPECIALTY	Experimental Soil Mechanics	2	2	4	5
				Total	**25**	**30**
5th Semester						
267-190501	SPECIALTY	Geotechnical Works	2	2	4	5
267-190502	SPECIALTY	Solid and Waste Management	2	2	4	5
267-190503	CORE	Reinforced Concrete I	2	2	4	5

267-190504	CORE	Geodesy	2	3	5	5
267-190505	Background	Research Methods	2	2	4	5
267-190506	SPECIALTY	Water Sysems and Water Treatment	2	3	5	5
				Total	**26**	**30**
6th Semester						
267-190601	SPECIALTY	Project Management II	2	2	4	5
267-190602	SPECIALTY	Bridge Engineering	2	2	4	5
267-190603	SPECIALTY	Geographical Information System	2	2	4	5
267-190604	CORE	Hydrology	2	2	4	5
267-190605	SPECIALTY	Sewage Systems and Calculation	2	3	5	5
267-190606	CORE	Environmental Informatics	2	2	4	5
				Total	**25**	**30**
7th Semester						
267-190701	SPECIALTY	Smart Cities	2	2	4	5
267-190702	CORE	Coastal Engineering	2	3	5	5
267-190703	SPECIALTY	Pollution and Pollution Control Technologies I	2	2	4	5
267-190704	SPECIALTY	Liquid Waste Processing Management	2	2	4	5
	SPECIALTY	Elective 1st	2	2	4	5
	SPECIALTY	Elective 2nd	2	2	4	5
				Total	**25**	**30**
8th Semester						
267-190801	CORE	Physical Oceanography	2	2	4	5
267-190802	SPECIALTY	Environmental Impact Studies	2	2	4	5
267-190803	SPECIALTY	Pollution and Pollution Control Technologies II	3	2	5	5
267-190804	Background	Business Administration and Entrepreneurship	2	2	4	5
267-190805	SPECIALTY	Renewable Energy Sources	2	2	4	5
	SPECIALTY	Elective 3rd	2	2	4	5
				Total	**25**	**30**
9ο ΕΞΑΜΗΝΟ						
267-190901	SPECIALTY	Groundwater Hydraulics and Hydrogeolgy	3	2	5	5
267-190902	SPECIALTY	Aquatic Ecosystems	2	2	4	5
267-190903	CORE	Reinforced Concrete II	2	2	4	5
	SPECIALTY	Elective 4th	2	2	4	5
	SPECIALTY	Elective 5th	2	2	4	5
	SPECIALTY	Elective 6th	2	2	4	5
				Total	**25**	**30**
				TOTAL HOURS OF (1ST+2nd+….+9th SEMESTER)	**225**	
10th Semester						
				Dissertation		**30**
				TOTAL ECTS OF (1ο+2ο+….+10ο semester)		**300**

9. POSTGRADUATE STUDY PROGRAMS IN THE DEPARTMENT

Three postgraduate study programs are currently offered in the Department of Environmental Engineering, School of Engineering

9.1 Postgraduate study program in Design and Construction of Civil Engineering Structures

The MSc "Design and Construction of Civil Engineering Structures" aims to promote knowledge in the field of design and construction, management of civil engineering projects, and the environment in the context of sustainable development, innovation, and competitiveness.

9.1.1 History

The MSc was established in 2018 (Government Gazette 2369, Issue B, 21/06/2018) with the Approval of the establishment of a Postgraduate Studies Program entitled: "Design and Construction of Civil Engineering Structures" of the Department of Civil Engineering T.E. of the School of Technological Applications (STEF) of the Alexander Technological Educational Institute of Thessaloniki (ATEITh).

It was re-established in 2019 (Government Gazette 3478, Issue B, 17/09/2019) with the Approval of the re-establishment of a Postgraduate Studies Program entitled: "Design and Construction of Civil Engineering Structures" of the Department of Environmental Engineering of the School of Engineering of the International Hellenic University (IHU).

The MSc will complete the 5-year cycle of studies in the academic year 2022-23, will continue its operation with the amendment of the Postgraduate Studies Regulation according to Law 4957/2022, and will operate until the academic year 2028-2029 (i.e., a duration of seven (7) years, according to para. c of article 80 of Law 4957/2022 (Government Gazette 141/ vol. A).

9.1.2 Goals and Objectives of the Postgraduate study program

The MSc aims to provide postgraduate level education in modern methods of analysis and broader planning of Civil and Environmental Engineering projects based on the new Greek and European regulations and laws while also specializing students in environmental management and protection technology, including socio-economic sectors and institutional issues directly related to environmental planning and the impact of projects and actions of sustainable development.

The objectives of the MSc are:
a) the high-level training of scientists who will be able to successfully staff key disciplines related to Civil and Environmental Engineering projects to contribute substantially to the production of integrated sustainable solutions,
b) the development and promotion of research in all fields relevant to civil and environmental engineering projects.

9.1.3 The postgraduate degree awarded

The MSc awards: Diploma of Postgraduate Studies (MSc) in "Design and Construction of Engineering Projects."

9.1.4 Admissions

Graduates of higher education institutions in Greece or similar institutions abroad (whose degree has been recognized by DIKATSA or by DOATAP) who wish to acquire scientific specialization in the broader cognitive area of the MSc and come from the Departments of Engineering, ASPAITE Engineering, Military Schools, Schools of Science and Geotechnical Schools are admitted to the MSc.

9.1.5 Duration of studies

The minimum duration of studies for the award of the Master's Degree is three (3) semesters, of which the first two (2) semesters are devoted to coursework and the third (3) semester is dedicated to the preparation of the thesis. At most, the maximum study period must be the typical duration of studies plus three (3) additional semesters (6 semesters in total).

9.1.6 Course schedule per semester

The courses of the programme with the corresponding ECTS credits are described below:

A/A	1st Semester	Course Type	Hours/ week	Weeks	ECTS
M101	Reinforced Concrete Sturctures	General Background	3	13	6
M102	Project Managment	General Background	3	13	6
M103	Environmental Management	Special Background	3	13	6
M104	Hydraulic Works	Special Background	3	13	6
M105	Elective 1	Speciality	3	13	6
					30
M105	*Elective 1*				
M105.1	Sustainable Infrastructure	Specialty	3	13	6
M105.2	Information and Communication Technologies (ICT) – Sustainable Development -Innovation	Specialty			
M105.3	Advanced Geotechnical Engineering	Specialty			
A/A	**2nd Semester**	**Course Type**	**Hours/ week**	**Weeks**	**ECTS**
M201	Inspection and Rehabilitation of the Built Environment	General Background	4	13	8
M202	Data Analysis, Optimization and Decision Making	General Background	4	13	8
M203	Coastal Engineering	Special Background	3	13	6
M204	Επιλογή 2	Speciality	4	13	8
					30
M204	*Επιλογή 2*				
M204.1	Flood Protection of Urban and Suburban Areas	Specialty	4	13	8

M204.2	Evaluation of the operation of technical projects	Specialty	

A/A	3rd Semester	Course Type	Hours/ week	Weeks	ECTS
M300	Diploma Thesis	Specialty			**30**

9.1.7 Number of admissions

The number of entrant admissions is set at fifty (50) students. In addition, one (1) scholarship holder of the I.K.Y. who succeeded in the relevant competition for domestic postgraduate studies of the subject of the MSc and one (1) foreign scholarship holder of the Greek State, according to the law 3685/148/16-7-2008, article 4, par. 3. The number of entrant admissions at the beginning of each cycle is updated by the Assembly of the Department.

9.1.8 The staff

TABLE of the EDUCATIONAL STAFF			
α/α	**FULL NAME**	**TITLE**	
1.	Anagnostopoulos Costas	Professor	Department Educational Staff
2.	Galinou-Mitsoudi Sofia	Professor	Department Educational Staff
3.	Konstantinidis Dimitrios	Professor	Department Educational Staff
4.	Savvidis Yiannis	Professor	Department Educational Staff
5.	Keramaris Evangelos	Associate Professor	Department Educational Staff
6.	Mentzelou Paraskevi	Associate Professor	Department Educational Staff
7.	Antoniou Fani	Assistant Professor	Department Educational Staff
8.	Syrpi Marina	Assistant Professor	Department Educational Staff
9.	Leousidis Alexandros	Lecturer	Department Educational Staff
10.	Papaliagkas Theodosios	Professor Emeritus	Department Professor Emeritus
11.	Telegloy Ilias	Associate Professor	Educational Staff from another IHU Department
12.	Kanakoudis Vasilios	Professor	Educational Staff from another University

13.	Karakasidis Theodoros	Professor	Educational Staff from another University
14.	Papadimitriou Chrisi	Doctoral Holder	Scientific Associate
15.	Petridis Christos	Doctoral Holder	Scientific Associate
16.	Tsikrikis Anastasios	Doctoral Holder	Scientific Associate

9.2 Inter-institutional MSc Program in “Health and Environmental Factors"

9.2.1 History

The inter-institutional MSc was established in 2018 (Government Gazette 3681, Vol. B, 29/08/2018) as the Establishment of the Inter-institutional Postgraduate Programme of Studies entitled "Health and Environmental Factors" between the Departments of Medicine of the Faculty of Health Sciences, Geology of the Faculty of Sciences of the Aristotle University of Thessaloniki, Medicine of the Faculty of Health Sciences of the Democritus University of Thrace and Civil Engineering TE of the Faculty of Technological Applications of the Alexander Technological Educational Institute of Thessaloniki.

9.2.2 Goals and Objectives of the Postgraduate study program

The aim of the MSc is the postgraduate teaching, research, training, and specialization of young scientists in Health and Environmental Sciences. Particular emphasis is placed on acquiring basic and applied laboratory and clinical research knowledge and skills.

The objective of the MSc is to study the influence of environmental factors on various human diseases as a foundation for understanding and clarifying their aetiopathogenesis and pathophysiology. Most diseases of modern society are of multifactorial etiology, and as a result, the influence of the environment on the broader set of these diseases deserves due attention and study. The determinants of the environment that influence health and illness are revealed through research at the molecular and histological levels.

9.2.3 The postgraduate degree awarded

The inter-institutional MSc awards a single Diploma of Postgraduate Studies (MSc) with the title: "Health and Environmental Factors".

9.2.4 Admissions

Students admitted to the program may be Graduates of the Departments of Medicine, Dentistry, Pharmacy, Biology, Nursing, Medical Laboratories, Veterinary Medicine, Agriculture, Geology, Chemistry, Physics, Mathematics, Engineering, Economics and Management Sciences, Computer Science, Psychology, Social and Humanities Studies, Physical Education Sciences, Nutrition, Aesthetics-Cosmetology, and other Departments from domestic Universities and Technological Educational Institutes the domestic as well as graduates from recognized similar

institutions of foreign countries as well as graduates of Military Schools of a relevant subject. Graduates of other Departments or Higher Educational Institutes may also be admitted following a decision by the Special Interinstitutional Committee (E.D.E.). Applicants may also be final-year students who will have successfully completed their undergraduate studies before the end of the registration period and who meet all the requirements for admission to the MSc. Members of the categories E.E.P., E.D.I.P., and E.T.E.P., provided that they meet the requirements of the first subparagraph of par. 1 Article 34 of Law No. 4485/2017 may be registered in excess and only one per year provided that they serve in one of the relevant Departments of the Institution where the Postgraduate Programme is organized.

9.2.5 Duration of studies

The duration for the award of the Diploma of Postgraduate Studies is three (3) academic semesters.

9.2.6 Course schedule per semester

The minimum duration of studies for the award of the Master's Degree is three (3) semesters, of which the first two (2) semesters are devoted to coursework and the third (3) semester is dedicated to the preparation of the thesis and internship (total of 90 ECTS). Four (4) compulsory courses and one elective of 13 teaching weeks are taught in the first semester. In the second semester, three (3) compulsory courses and two (2) elective courses of 13 teaching weeks are taught. The practical training and the diploma thesis are carried out in the third semester.

Semester 1

1. Introduction to Environmental Sciences
2. Basic Biomedical Knowledge of the Pathways of Exposure and Metabolism of the Human Body
3. Building Materials and Health
4. Environmental factors and tissues
5. One (1) elective course*.

Semester 2.

1. Environmental phenomena and health.
2. Geographical Information Systems - Biostatistics - Medical Informatics
3. Infectious, Mutagenic, Toxic Agents - Methodologies for the control of mutagens/ Teratogenesis, Carcinogenesis, and Environment
4. One (1) elective course*
5. One (1) elective course*.

Semester 3

Internship
Postgraduate thesis

Elective courses

1. The effect of nutrition on tissues
2. Influence of the environment on tissue and cell regeneration
3. Effect of the environment on the central and peripheral nervous system

4. Environmental/therapeutic radiation and health effects
5. Management of financial resources in health in cases of environmental disasters
6. Design of first aid infrastructure in environmental emergencies

9.2.7 Number of admissions

The annual number of admissions to the MSc is set at forty (40) postgraduate students. The procedure and the selection criteria are defined in the relevant Regulation for Postgraduate Studies, which has been approved by the Senate of the Aristotle University of Thessaloniki (meeting number 2958/12 and 13-4-2018) as indicated in the announcement.

9.2.8 The staff

For the implementation of the inter-institutional MSc, faculty members of the Department of Medicine of the Faculty of Health Sciences and the collaborating Departments of Geology of the Aristotle University of Thessaloniki (AUTH), Medicine of the Faculty of Health Sciences of the Democritus University of Thrace (AUTH) and the Department of Environmental Engineering of the Schhool of Engineering of the I.H.U. (previously Civil Engineering TE of the School of Technological Applications of the ATEITH) are employed. Faculty members of other Departments of the collaborating or other HEIs of the country, as well as other categories of lecturers and visiting lecturers (renowned scientists, scientists of recognized prestige) from the country and abroad according to the provisions of Article 36 of Law No. 4485/2017 (A΄114).

9.3 Inter-institutional MSc Program in “New Materials & Technologies in Structural Design "

The inter-institutional MSc "New Materials & Technologies in Structural Design" aims to develop high-quality postgraduate studies with modern scientific and technological orientation and also to connect with the labor market and national technical problems and policies to produce competent scientists-researchers for the application of new interdisciplinary knowledge in the broader field of structural engineering.

9.3.1 History

The inter-institutional MSc was established in 2018 (Government Gazette 2870, Issue B, 19/07/2018) as: Approval of the establishment of an Inter-institutional Postgraduate Studies Programme entitled: "New Materials & Technologies in Structural Design" of the Department of Civil Engineering of the Faculty of Engineering of the Democritus University of Thrace in collaboration with the Department of Civil Engineering of the AlexanderTechnological Educational Institute of Thessaloniki (ATEITH).

9.3.2 Goals and Objectives of the Postgraduate study program

The subject of the inter-institutionalMSc is the study of new materials and new technologies in terms of seismic design, concrete technology, and structural interventions (repairs - reinforcements), as well as the impact of the environment on structures and structures on the environment.

The objectives of the MSC are:

a) The high-level postgraduate education, research, training, and specialization of young scientists in contemporary areas of the science of Civil Engineering, oriented to the latest developments in the broader field of structural engineering.
b) The transfer of knowledge and the acquisition of skills i) in the use and application of new technologies for the inspection of existing structures with or without damage, ii) in the interpretation of the results of inspections, iii) in the design of the necessary interventions and iv) in the restoration of damage resulting from seismic or environmental actions in civil engineering works using new materials and technologies.
c) In-depth knowledge of modern concepts of structural design, the application of new concrete and seismic regulations and specifications and provisions related to new technologies and corrosion.
d) The creation of excellent scientists-researchers who will support the country in international developments and penetrate new branches of science covered by the MSc.
e) Maximizing the use of computers and the opportunities offered by information technology.
f) To deepen and acquire specialized knowledge in environmental design and interaction with the environment.
g) To address more effectively the country's needs for civil engineering projects by providing specialized staff for the study, analysis, design, and management of such projects.

9.3.3 The postgraduate degree awarded

The inter-institutional MSc awards a single Diploma of Postgraduate Studies (MSc) with the title: "New Materials & Technologies in Structural Design".

9.3.4 Admissions

Students admitted to the program may be civil or other engineering graduates from Greek universities or recognized similar institutions from abroad and graduates from university departments of a related science in Greece or abroad.

9.3.5 Duration of studies

The duration for the award of the Diploma of Postgraduate Studies is three (3) academic semesters.

9.3.6 Course schedule per semester

Each postgraduate student must attend and pass a total of ten (10) courses, of which five (5) are selected during the first semester and the other five (5) are selected during the second semester from a list of courses offered. During the 3rd semester, postgraduate students must complete a postgraduate thesis corresponding to thirty (30) ECTS.

Semester 1

A1. New Concepts and New Materials in the Design of Reinforced Concrete.

A2. Seismic Behaviour of Reinforced Concrete Structures - Use of Integrated Computer Software.
A3. Mechanical behaviour of composite materials
A4. Modern Ways of Mathematical Modelling in the Structural Sector
A5. Reinforced Concrete and Modern Industrialized Building
A6. Research Methodology of Reinforcement and Repair in Reinforced Concrete Structures
A7. Mechanics of Deformable Bodies
A8. Computer Programming for Engineers
A9. Bioclimatic Design of Reinforced Concrete Structures and Housing Complexes
A10. Experimental Geomechanics
A11. Advanced Geotechnical Engineering
A12. Special Chapters in Fracture Engineering

Semester 2

B1. Integrated Computer Software and Information Technology in the Design of Reinforced Concrete Structures.
B2. Behaviour and Design of Reinforced Concrete Structural Elements with Synthetic Reinforcement
B3. Modern Systems of Earthquake Protection of Structural Structures
B4. Control and Intervention Techniques in Reinforced Concrete Structures
B5. Theory of Plasticity and Mechanics of Failures
B6. Non-linear Finite Elements
B7. Experimental Strength of Materials
B9. Experimental Methods of Technology and Control of Concrete
B10. Dimensioning of reinforced concrete elements reinforced with composite materials
B11. Cement - Concrete Chemistry
B12. Modern Systems of Protection and Covering of Reinforced Concrete Structures with New Materials
B13. Environmental actions - Repair materials
B14. Inspection, Repair and Reinforcement of Structures

9.3.7 Number of admissions

The number of entrant admissions is set at thirty (30) students

9.3.8 The staff

For the implementation of the inter-institutional MSc, faculty members of the Department of Civil Engineering of the Democritus University of Thrace and the Department of Environmental Engineering of the School of Engineering of the I.H.U. (previously Civil Engineering TE of the School of Technological Applications of the ATEITH) are employed.

10. DOCTORAL STUDIES in the DEPARTMENT

The Doctoral Studies in the Environmental Engineering Department of the School of Engineering of the International Hellenic University were approved by the Government Gazette 1033, Issue Β΄, 17/03/2021 and aim to promote knowledge through the production of original scientific research and lead to the award of a Doctoral Degree.

Eligibility criteria

Those who meet the following eligibility criteria may apply for a Ph.D. thesis in the Department of Environmental Engineering:

α) Are graduates from a higher education institution (University or TEI) in Greece or a recognized equivalent institution abroad and hold a Diploma of Postgraduate Studies of a higher education institution in Greece or a recognized equivalent institution abroad, or

b) Are graduates or holders of an integrated master's degree under Article 46 of Law No. 4485/2017.

c) In the following exceptional cases, Ph.D. candidates who do not hold a Diploma of Postgraduate Studies (M.Sc.) can be accepted as Ph.D. candidates if (i) they have a degree or degrees of a total of 5 years of study from a domestic university or T.E.I. or a foreign recognized equivalent institution that provides them with sufficient knowledge to deal with the topic of the doctoral thesis, as evidenced by the existence of exceptionally high grades (excellent) in at least two subjects that relate to the proposed doctoral thesis and (ii) they have at least one publication in a reputable international journal which is relevant to the proposed thesis topic or two presentations or posters in national and/or international conferences and/or have significant professional experience in the field of the proposed doctoral thesis; In these cases: i) the Assembly of the Department must adequately justify its decision following a proposal and a detailed memorandum of the three-member Evaluation Committee per the provisions of par. 3 of Article 38 of Law 38 of the Law. 4485/2017, and ii) The candidate must attend and successfully pass courses of the Postgraduate Studies Programmes of the Department and/or other Departments of the IHU, determined by the three-member Evaluation Committee and the Supervisor.

The suitability of the candidate's qualifications and knowledge, as well as exceptional cases, are examined by the three-member Evaluation Committee and approved exclusively by the Assembly of the Department.

Duration

The duration of the Doctoral Degree is at least three (3) full calendar years from the date of appointment of the three-member advisory committee.

For doctoral candidates who are exceptionally admitted without holding an MSc, the minimum time limit for obtaining the Doctoral Degree is four (4) full calendar years from the date of appointment of the three-member advisory committee.

The maximum time for completion of the dissertation is, in any case, set at six (6) years. The above time may be extended by annual extensions for two (2) additional years upon request of the candidate and a well-founded decision of the Departmental Assembly.

More information can be found in the regulations for doctoral studies on the Department's website http://www.env.ihu.gr.

11. SERVICES and STUDENT WELFARE OFFICE

11.1 European Programs Office (Erasmus)

Erasmus+ is the European Commission's program for education, training, youth, and sport, which aims to enhance skills and employability and modernize education, training, and youth systems in all areas of Lifelong Learning (Higher Education, Vocational Education, and Training, Adult Education, School Education, Youth activities, etc.).

The mobility program provides opportunities for students:

* to carry out part of their studies abroad for 3 to 12 months,
* to carry out their internship in a European Union country
* receive a scholarship,
* to have their studies abroad recognized,
* get to know another country, and a new culture, and make new friends

Link to Alexander Campus - Sindos: https://www.ihu.gr/en/academic-units/intprogse

11.2 Library

The I.H.U. has a Central Library as an independent and decentralized unit. Its official title is "Library and Information Centre of the International Hellenic University."

The Central Library is located in Thessaloniki.

The Library is part of the Publications and Library Department under the Directorate of Coordination of Studies, Publications, and Library. It consists of the Central Library and the Study Centres of the School of Economics and Business Studies and Health Sciences.

The Library's collection includes books, e-books, Greek and foreign language magazines, maps, video cassettes, audio cassettes, vinyl records, optical discs, art paintings, and newspapers.

By constantly enhancing its collection and provision of services, the Library's mission is to serve the information needs of the entire academic community, in so far as these are related to the curriculum of the Institution, the research and recreational interests of teachers, students, and administrators, as well as the cultural interests of the wider community. The Library's services are no longer limited to its physical premises, as a wealth of information is provided electronically via the Internet on a 24/7 basis. The range of its services is constantly expanding in response to the demands of its academic role, both nationally and internationally, as a modern and valuable source of information addressed to students, teachers, scientists, researchers, etc.

11.3 Student Restaurant

In the main building of the Alexander Campus, there is a restaurant that provides meals to students according to the following schedule:

Monday to Friday:

- Breakfast: 07.30-09.00
- Lunch: 12.00-16.30
- Dinner: 19.00-21.00

Saturday - Sunday

- Breakfast: 07.30-09.00
- Lunch: 12.30-14.00
- Dinner: 18.30-20.00

For those who wish, meals are also served in a branch of the restaurant located in the center of Thessaloniki (A. Seraphim 4) according to the following schedule:

Daily:

-Breakfast 07.30-09.00
- Lunch: 12.00-16.00
- Dinner: 17.30-21.30

The criteria, conditions, and way of determining the beneficiaries of free meals are defined in the Government Gazette B 1965/18.06.2012 (Decision 4).

11.4 Student Dormitory

The Student Dormitory of the Alexander Campus of the IHU has facilities in Sindos with 108 double rooms. The National Youth Centre manages the Student Dormiotry. It accepts applications from new students 20 working days after the announcement of the university entrance examination results.

11.5 Student Health Care Service

At the Alexander Campus of Sindos, there is a Medical Clinic (opposite the Administration building) where students needing first aid and health care can come daily during working days and hours (7:30-15:30).

In addition, a voluntary blood donation service is held twice a year in the Medical Centre, and students can participate.

According to paragraph 3 of article 31 of Law 4452 /2017 (A' 17), uninsured undergraduate and postgraduate students and doctoral candidates are entitled to medical and hospital care from the National Health Care System (NHS) with the relevant costs covered by the National Health Service Provider Organization (NHSO). Therefore, uninsured students with their AMKA are directed to Public Health Facilities.

11.6 The University Gym

The mission of the Alexander Campus Sports Centre of the IHU is to provide a wide range of sports programs and activities for all students and IHU staff. The goal of all programs is the qualitative improvement of the academic community members through exercise, play, and physical activity.

The IHU's Alexander Campus Sports Center includes all outdoor and indoor sports facilities located within the IHU campus: the IHU Indoor Gymnasium, outdoor basketball courts, outdoor soccer field, and any other sports facilities that may be created at the IHU in the future.

11.7 Sports and Cultural Activities

The Alexander Campus Sports Center in Sindos, taking into account that it is addressed to people with different needs and abilities, organizes a series of programs that include the following areas: Recreational Sports, Organized Activities-Classes, Indoor Championships, Tournaments and Sports Days, Sports Programs, Competitive Sports, Excursions-Daily Nature Trips.

11.8 Network Operations Center (NOC)– Electronic Services

The Network Management Center of the Alexander Campus o in Sindos, Thessaloniki, Greece, designs and develops the network and telecommunications infrastructure of the campus, providing high-quality services to the institution's members. It is responsible for the smooth operation, maintenance, and development of the equipment, interfaces, and services of the institution's Data Network. In addition, it ensures the continuous upgrading and modernization of the infrastructure, introduction, and familiarization with cutting-edge technologies in Information Technology and Telecommunications.

Electronic services

ELECTRONIC SECRETARIAT: https://uniportal.ihu.gr

ACTIVATION OF A UNIVERSITY ACCOUNT: http://uregister.ihu.gr

ASYNCHRONOUS LEARNING PLATFORM (NEW MOODLE): https://exams-sm.the.ihu.gr

ELECTRONIC MAIL (EMAIL): https://webmail.teithe.gr

ACADEMIC IDENTITY CARD (PASSPORT): https://academicid.minedu.gov.gr

ELECTRONIC DECLARATION OF AUTHORSHIP PAGE: https://eudoxus.gr

WIFI SERVICE: https://noc.the.ihu.gr/eduroam-2/

NETWORK OPERATIONS CENTRE: https://noc.the.ihu.gr/

EVRIKA INSTITUTIONAL DEPOSITORY UGP Environmental Engineering:
http://eureka.teithe.gr/jspui/handle/123456789/13646

EVRIKA INSTITUTIONAL DEPOSITORY UGP Civil Engineering:
http://eureka.teithe.gr/jspui/handle/123456789/1101

NATIONAL ARCHIVE OF DOCTORAL THESES: https://www.didaktorika.gr/eadd/

HEAL LINK: http://www.heal-link.gr

HEAL 1000: https://f1000research.com/heallink

12. INTERNATIONAL DIMENSION and PARTNERSHIPS

The Erasmus+ programme for higher education funds the mobility of students at all stages of their studies for either study or work placements, teachers for teaching and staff for training in universities in EU countries.

Within the framework of the ERASMUS+ Programme, the Department cooperates with the following 31 foreign educational institutions in 13 countries for student mobility for studies, and the list is constantly enriched with new partnerships

	Country	**University/Institution**	**Erasmus Code**
1	Belgium	Universite De Liege	B LIEGE01
2	Cyprus	Frederick University Nicosia	CY NICOSIA 23
3	Czech Republic	VSB - TECHNICKA UNIVERZITA OSTRABA	CZ OSTRAVA01
4	Germany	Fachhochschule Regensburg, Germany	D REGENSB 02
5	Spain	Universidad de Almeria - Spain	E ALMERIA 01
6	Spain	Universidad de Cadiz - Spain	E CADIZ 01
7	Spain	Universidad de Cordoba – Spain	E CORDOBA 01
8	Spain	Universidad de Huelva – Spain	E HUELVA 01
9	Spain	Universidad de Jaen, Spain	E JAEN 01
10	Estonia	Tallinn College of Engineering-Tallinn-Estonia	EE TALLINN 06
11	France	FESIA, Angers - France	F ANGERS 08
12	France	CY Cergy Paris Universite	F CERGY-P11
13	France	Universite de Cergy-Pontoise - Portugal	F CERGY 07
14	France	Universite de Nantes	F NANTES01
15	France	CESI	F PARIS 335
16	France	Université de technologie de Troyes	F TROYES08
17	Italy	Universita Di Messina – Italy	I MESSINA 01
18	Lithuania	Aleksandras Stulginskis University - Lithuania	LT KAUNAS 05
19	Lithuania	Klaipeda State College, Lithuania	LT KLAIPED 09
20	Portugal	Instituto Politecnico de Braganca, Portugal	P BRAGANC 01
21	Portugal	Instituto Politecnico de Coimbra	P COIMBRA 02
22	Portugal	Polytechnic Institute of Guarda, Portugal	P GUARDA 01
23	Portugal	Instituto Politecnico de Lisboa - Portugal	P LISBOA 05
24	Poland	Poznan University of Life Sciences - Poland	PL POZNAN 04
25	Poland	Warsaw University of Technology - Poland	PL WARSAW 02
26	Poland	Wroclaw University of Environmental & Life Sciences, Poland	PL WROCLAW 04
27	Romania	1 Decembrie 1918 University, Alba Iulia – Romania	RO ALBAIU 01
28	Serbia	The Academy of Applied Technical Studies Belgrade	RS BELGRAD24
29	Turkey	Istanbul Technical University, Turkey	TR ISTANBU 04
30	Turkey	Nisantasi Universitesi, Turkey	TR ISTANBU 45
31	Turkey	Dokuz Eylul University	TR IZMIR01

The Department hosts students from foreign universities every year through the Erasmus+ programme, offering all undergraduate and postgraduate courses in English. In particular, for incoming Erasmus+ students to attend courses of the postgraduate programme, the agreement of the Departmental Assembly is required, following the recommendation of the Erasmus Academic Coordinator.

13. REFERENCE to the DEPARTMENT and UNIVERSITY REGULATIONS

Below are the hyperlinks to the various regulations of the Department and the University (study program operational thesis, ethics, etc.).

INTERNATIONAL HELLENIC UNIVERSITY

IHU Internal Regulation: https://www.ihu.gr/modip/wp-content/uploads/sites/5/2021/09/ΕΣΩΤΕΡΙΚΟΣ-ΚΑΝΟΝΙΣΜΟΣ-ΔΙΠΑΕ.pdf

Code of Moral Conduct and Research Ethics: https://www.ihu.gr/modip/wp-content/uploads/sites/5/2022/12/Research_Ethics.pdf

Regulations for Student Residences: https://www.ihu.gr/wp-content/uploads/2020/12/ΦΕΚ_5113_Β__19-11-2020_ΚΑΝΟΝΙΣΜΟΣ_ΕΣΤΙΑΣ.pdf

DEPARTMENT OF ENVIRONMENTAL ENGINEERING

Undergraduate Study Program: https://env.ihu.gr/tomis/ππσ-μηχανικών-περιβάλλοντος/συνοπτικό-πρόγραμμα-σπουδών

Study Guide: https://env.ihu.gr/wp-content/uploads/2022/10/2022-2023-Οδηγός-Σπουδών.pdf

Study Regulations: https://env.ihu.gr/wp-content/uploads/2022/09/Κανονισμός-Σπουδών.pdf

Operating Regulations (Curriculum Issues, Examination Regulations, Student Issues, Administrative Issues): https://env.ihu.gr/wp-content/uploads/2022/09/Εσωτερικός-Κανονισμός-Λειτουργίας-του-Νέου-Προγράμματος-Σπουδών.pdf

Regulations for Diploma Thesis: https://env.ihu.gr/wp-content/uploads/2022/09/Κανονισμός-Εκπόνησης-Διπλωματικών-Εργασιών.pdf

Academic Advisor Regulations: https://env.ihu.gr/wp-content/uploads/2022/09/Κανονισμός-Λειτουργίας-Θεσμού-Ακαδημαϊκού-Συμβούλου.pdf

Regulations for the Operation of the Student Complaints and Dispute Management Mechanism: https://env.ihu.gr/wp-content/uploads/2022/09/Κανονισμός-Λειτουργίας-Μηχανισμού-Διαχείρισης-Παραπόνων-και-Ενστάσεων-Φοιτητών.pdf

14. APPENDIX: DETAILED COURSES OUTLINE

14.1 1st Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190101	**MATHEMATICS I**		**6**
	General Background (Th/ Tut)	**Aim:** The course gives the basic principles of Differential & Integral Calculus, their presentation and to understand their use as tools that help in describing and solving real problems.	
		Content: Exponential,logarithmic, trigonometric functions and their applications, limits and continuity of functions, Derivatives, differentials, related rates of change, maxima and minima, optimization of functions, definite and indefinite integrals – integration techniques, applications of integration (Areas between two curves, volumes and surfaces of solids by revolution, moments and centroids), sequences and series of real numbers – Power series.	
267-190102	**PHYSICS**		**5**
	General Background (Th/Tut)	**Aim:** This course is to make students learn and understand basic concepts and principles of physics to analyze practical engineering problems and apply its solutions effectively and meaningfully.	
		Content: Mechanics of materials (kinematics, statics, dynamics). Work. Power. Energy. Gravity filed. Periodic motions (simple harmonic oscillation, Fourier analysis, applications). Fluid mechanics. Heat, temperature, temperature measuring, calorimetry. Thermal expansion, heat transfer, heat insulation. Waves. Wave energy. Doppler phenomenon. Sound, acoustics, ultrasounds, noise pollution. Graphical representation, least square method, theory of errors, determination of ground acceleration, friction coefficient, vibrations, impact loading, calculation of fluid density. Computer simulation.	
267-190103	**STRUCTURAL ANALYSIS I**		**5**
	General Background (Th/Lab)	**Aim:** The aim of the course is to teach the students the fundamental principles and methods of structural analysis and design	
		Content: Structures in equilibrium (determinate structures): Supports, loads, free body diagrams. Calculation of reactions, axial force, bending moment and shear force diagrams. Beams and frames. Principle of superposition. Trusses: Method of joints. Method of Ritter sections. Centroid and centre of mass: Complex bodies. Static first moment of section area about an axis. Second moments of section areas: Definitions. Theorems of parallel axes, (Steiner). Principal axes of inertia. Mohr's Circle.	

267-190104	**COMPUTER AIDED ENGINEERING DRAWING**		**5**
	General Background (Lab)	**Aim:** The course aims at teaching basic drawing methods and the comprehension of technical drawings using computers	
		Content: Introduction to line drawing, dimensions, drawing scale, drawing of an object. Geometric structures (applications). Drawing of an object – projection system (drawing of elevation and cross-sections). Volumetric representation of an object (global drawing of an object, axonometric drawing, drawing the axonometric from the elevations). Drawing sketches (free designing of an object). Application specialised issues (drawing buildings, mechanical drawing and electromechanical drawing).	
267-190105	**INFORMATICS**		**4**
	General Background (Th/Lab)	**Aim:** The purpose of this course is to provide computer literacy to the student. The course is designed to prepare the student for a successful working relationship with computerized systems and will present to him/her what the computer is, what it can and cannot do, how it operates, how it is programmed, how it is used as a tool in decision making, and what are the social implementations of computer usage.	
		Content: Concept of IT, IT Sections, IT Autonomy, Limitations and Risks of IT, Historical Evolution of Computer Science, Organization of Computer Systems (Binary, Gates and Logic Circuits, Von Neumann Architecture), Computer Hardware (Input / Output and Mass Storage, Numeric and Logic Course, Control Course, Pyramid of Memory), Computer Software (Software Concept, Algorithm) , Creative Application Packages, Graphics & Multimedia, Computer Exploration - Networks & Internet, Artificial Intelligence. Computer Problem Solving, Logic Chart, Algorithms (Algorithm Design, Algorithm Efficiency), Computational Algorithms and Statistical Descriptive Algorithms, Risks and Internet Protection, Computer Bad and "Partial" Ways (Privacy, Hacking-Cracking, Cryptography. Windows, Ms Office (Word, Excel, PowerPoint.)	
267-190106	**ECOLOGY**		**5**
	Core (Th/Lab)	**Aim:** The course provides information for the thematic field of Ecology, helping students to understand the relationships between organisms and nature, between organisms themselves and the needs of life such as biotic and abiotic factors in an environment.	

		Content: Objectives and basic concepts of Ecology. Types of Environmental Ecosystems. Food chains and productivity. Relationships of species. Energy flow. Succession. Biodiversity and Abundance. Species and populations. Abiotic parameters, Clima, Soil, Temperature, Light and organisms. Biogeochemical and hydrological cycles. Disturbance of cycles, Pollution and effects. Microplastics. Population dynamics, age and generations, life tables. Laboratory and/or in situ Exercises: Identification of Land & Aquatic Ecosystems. Recognizing relationships of organizations. Biodiversity and Species. Biodiversity analysis with diversity assessment (Shannon, Simpson indices). Natural and disturbed ecosystems.	

14.2 2nd Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190201	**MATHEMATICS II**		**5**
	General Background (Th/ Tut)	**Aim:** The purpose of this course is to provide the basic principles of Differential & Integral Calculus in several variables and Vector Calculus and to understand their use as tools that help in describing and solving real problems	
		Content: Vectors in space (inner product, cross product, triple product, Lines and Planes in the Space, Polar, Cylindrical and Spherical Coordinates, Partial derivatives of functions in several variables, Directional derivatives, Gradient vectors & Tangent planes, Maxima and minima, Double, triple integrals & their applications, Line integrals, Surface integrals & their applications.	
267-190202	**STRENGTH OF MATERIALS**		**4**
	General Background (Th/Lab)	**Aim:** The aim of this subject is to provide the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.	
		Content: Concept of stress and strain, generalized Hooke's Law, axial load, torsion, (from Catalog) pure bending, transverse loading, transformation of stress and strain components in 2D, design of beams and shafts for strength, deflection of beams, work and energy, columns.	
267-190203	**BIOLOGY**		**5**
	Core (Th/Tut)	**Aim:** The course provides knowledge for the life origin, the cellular function, species evolution and diversity in order to understand the regulation of populations growth, the processes that occur at the community level, to forecast the population growth and what parameters are crucial for the growth.	
		Content: Cells, Structure and function. Plant-Animal Organisms, Morphology, Reproduction, Evolution & Classification. Life Cycle (Reproduction-Growth-Age). Factors affecting living conditions. Utility-Application of biological knowledge. Laboratory: Identification of plant and animal species in the laboratory and in the field.	
267-190204	**COMPUTER MODELING APPLICATIONS FOR ENGINEERS**		**5**
	General Background (Th/Lab)	**Aim:** The course bridges the gap between the science of environmental modeling and working models of environmental systems.	

		Content: Introduction to modeling, science and art of mathematical modeling. A primer on mathematics with examples of computer implementation of standard mathematical calculi. Reviews of the fundamentals of environmental processes, engineered systems, and natural systems, respectively. Description and comparison of software packages for developing environmental models. Modeling examples covering engineered and natural systems, respectively.	
267-190205	**ENVIRONMENTAL ENGINEERING GEOLOGY**		**5**
	Core (Th/Lab)	**Aim:** The aim of the course is to understand the interaction between geology and the environment in the context of human activity and in particular the construction of technical works.	
		Content: Hydrodynamic processes in the coastal and nearshore regions. Waves, tides, and currents. Morphology and modification of shoreline. Protection, and restoration of coastal areas. Design of coastal and maritime structures. Coastal and maritime structures management. Emphasis is placed on the impact of anthropogenic interventions on the environment in the context of geological hazards (earthquakes, floods, landslides, subsidense, etc), natural resources, water use and sustainability.	
267-190206	**ENVIRONMENTAL CHEMISTRY**		**6**
	Core (Th/Lab)	**Aim:** The aim of this course is to study the chemistry of air, water, and toxic organic compounds as well as how anthropogenic activities affect this chemistry on planet Earth.	
		Content: This course examines the sources, reactions, transport, effects, and fates of chemical species found in air and water as well as the effects of technology thereon. This course is divided into 4 major parts that reflects the most pressing issues in Environmental Chemistry today: (1) Atmospheric Chemistry and Air Pollution; (2) Climate Change and Energy; (3) Water Chemistry and Water Pollution; and (4) Toxic Organic Compounds.	

14.3 3rd Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190301	**HYDRAULICS OF CLOSED PIPES**		**5**
	Core (Th/Lab)	**Aim:** The aim of the course is to provide students an understanding of the subject of the laws of Hydraulic Closed Circuits and to become familiar with the principles of continuity, momentum and energy and dealing with hydraulic problems.	
		Content: Physical Properties of Fluids (Density and Specific Gravity - Temperature - Pressure - Compressibility, Thermal Expansion and Elasticity Measure - Specific Heats c - Vapor Voltage - Surface tension). Transfer properties (Viscosity - Viscosity coefficient - Thermal conductivity coefficient λ - D molecular diffusion coefficient). Hydrostatic (Pressure as Point Size - Law of Hydrostatic - Hydrostatic Pressure Distribution - Hydrostatic Pressure Diagrams - Transporting Vessels - Isobaric or Isotropic Surfaces - Rotating Fluids - Fluid in a Straight Linear-Influential Linear- of the constituted force - Forces on curved surfaces - Horizontal components of the forces - Vertical component of the force - Association - Recommended force. Hydrodynamics (Flow Field - Flow Lines - Lines - Transmission Lines - Time Lines - Continuity Law - Transfer Theorem or Reynolds - Complete Form of the Law of Continuity - Law of Hydrodynamics (Integral Form) - Law of Hydrodynamic Bernoulli). Closed ducts, loss curves, piezometric line and power line. Preparation of a topic related to a series of exercises - experiments on the above topics addressed in the course.	
267-190302	**SOIL MECHANICS**		**5**
	Core (Th/Lab)	**Aim:** This course is intended for introductory in soils anf geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Introduction to soil mechanics. Soil formation classification and mineralogy. Characteristics and engineering properties of soil: density, strength and deformability, water content, Atterberg limits, permeability and seepage. Sub-surface soil investigation. Soil-water movement. Mechanical behavior of a soil element. Description of the state of stress at a point in soil. Effective stress, consolidation, and soil strength, Mohr circle. Stress-strain relationships under different loading conditions. Unconfined and triaxial compression. Simple shear and shear strength of a soil element. Mohr-Coulomb failure criterion. Applications: Slope stability.	

267-190303	**STRUCTURAL ANALYSIS II**		**5**
	Core (Th/Lab)	**Aim:** The aim of the course is to provide the basic principles for the calculation of structures regardless their form and shape	
		Content: Calculation of bending moments, shear forces and axial forces for statically determinate and indeterminate structures, influence lines for statically determinate structures under live loads.	
267-190304	**PROJECT MANAGEMENT I**		**5**
	Core (Th/Tut)	**Aim:** The purpose of this course is to introduce the student to basics of construction project organization and planning, including scheduling and financial planning.	
		Content: Introduction to Project Management, Construction Site Organization and Set Up, Machinery and Equipment Productivity, Project Scheduling (Linear and Network Scheduling), Project Financial Planning (Cost and Income Curves), Resource Management, Project Control (Earned Value Analysis).	
267-190305	**PROBABILITY AND NUMERICAL METHODS**		**5**
	Core (Th/Tut)	**Aim:** The objective of this subject is to expose students to understand the basic notions of probability theory and numerical analysis, and their applications to environmental engineering.	
		Content: Probability theory: Axioms of probability, Conditional probability, Independence, Bayes' theorem). Random variables, mass function & cumulative distribution function, mathematical expectations, variance and standard deviation. Skewness and Kurtosis. Basic distributions functions (Binomial, Geometric, Poisson, Exponential, Normal) and their applications. Numerical Analysis: Numerical Methods for solving equations (Iteration, false position, Newton Raphson). Numerical methods for solving systems of linear equations (Gauss-Seidel, LU decomposition). Newton-Raphson method for the system of nonlinear equations. Numerical methods for solving ordinary differential equations (Taylor, Euler, Runge – Kutta)	
267-190306	**ENVIRONMENTAL AND PUBLIC WORKS LEGISLATION**		**5**
	Core (Th/Tut)	**Aim:** The purpose of this course is to familiarize the student with the legal framework in Greece around the procurement of public service, supply and works contracts (design, permits, tender and execution), as well as the procedure for obtaining permits for private owned building projects.	

		Content: Analysis, explanation and examples of the application of National and European legislation for the procurement and execution procedures of works, supplies and consultancy contracts (L.4412/2016). Introduction to the National Environmental Legislation (L. 4014/11), Land Expropriation Code (L. 2882/2001), Building Code (L. 4495/2017). Introduction to Greek and International Standard Contracts.	

14.4 4th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190401	**ANALYTICAL DECISION MAKING METHODS**		**5**
	Speciality (Th/Tut)	**Aim:** The purpose of this course is to provide students with decision-making skills and methodologies in relation to project management dilemmas.	
		Content: Multi Criteria Decision Making Methods (Multi Attribute Utility Theory, Analytical Heirarchy Process, PROMETHEE, TOPSIS). Group Decision Making. Cost Optimization. Investment Evaluation	
267-190402	**FOUNDATIONS AND SUPPORTS**		**5**
	Specialty (Th/Lab)	**Aim:** This course is intended for introductory in soils anf geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Foundation design principles. Selection of foundation type. Bearing capacity and settlements of shallow foundations. Admissible settlements of structures. In-situ tests for the design of foundations. Spread footings, combined footings, beams on elastic foundations, raft foundations. Retaining walls and earth pressure theories. Slope stability. Deep foundations. Piled foundations and construction methods. Bearing capacity and settlements of piles.	
267-190403	**EARTHQUAKE ENGINEERING**		**5**
	Core (Th/Tut)	**Aim:** The course aims to familiarise students with the basic principles of earthquakes and the their effects to structures, be able to recognise and resolve problems due to earthquakes and to apply practical methods in the design of structures	
		Content: General knowledge and principles about earthquakes and seismology. Equation of motion of Single Degree Of Freedom (SDOF) systems. Forced vibrations of MDOF systems, damping, natural periods and normal modes. Modelling of structures and seismic loads for dynamic analyses. Dynamic loading and response of structures. Basic concepts of seismic analysis of structures. Seismic analysis methods and applications with the existing Seismic Regulations for Construction.	
267-190404	**OPEN CHANNEL HYDRAULICS**		**5**
	Core (Th/Lab)	**Aim:** The aim of the course is to provide students of the laws of Open Channels; Hydraulics and to be able to meet the needs of the design and construction of hydraulic projects as much as possible.	

		Content: Open channels (uniform flow, types of Chezy, Cutter, Manning, critical flow, subcritical flow, supercritical flow, financial cross sections, non-uniform flow, hydraulic jump, flow under gate). Leakage through holes. Extruders (Extruder types, flow metrics). Flow in piping networks (Floating and parallel pipes, Cross method). Hydraulic machines Pumps, turbines, characteristic curves, caving. Preparation of a topic related to a series of exercises - experiments on the above topics addressed in the course.	
267-190405	**ENVIRONMENTAL DATA PROCESING AND ANALYSIS**		**5**
	Core (Th/Tut)	**Aim:** The course provides the analysis tools of data with statistical methods comparing and evaluating of results. This knowledge will facilitate the graduate in his academic life to evaluate environmental factors based on research data or collected information in order to make decisions or to propose solutions.	
		Content: The need to collect and process data. Evaluation of the collected data. Use of a statistical package. Parameters and variables. Data control and management. Descriptive statistics. Comparison of samples (t-tests, one way ANOVA). Linear regression. Graphical illustrations of data analysis results. Information Management, Ethics and Intellectual Property. Laboratory: Searching for data and application of appropriate statistical analysis according to the purpose of research.	
267-190406	**Experimental Soil Mechanics**		**5**
	Specialty (Th/Lab)	**Aim:** This course is an introduction to soils and geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Soil classification methods. Determination of physical and mechanical properties of soils. Laboratory tests: determination of plasticity and liquidity limits, compaction test, sand cone test, measurement of hydraulic conductivity, direct shear test, consolidation test, triaxial compression test.	

14.5 5th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190501	**GEOTECHNICAL WORKS**		**5**
	Specialty (Th/Tut)	**Aim:** This course is an introduction to soils and geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Site exploration and in-situ testing: standard penetration test (SPT), cone penetration test (CPT), pressuremeter test. Critical state theory – advanced topics in soil behavior. The finite element method 16 October 2015 14 in geotechnical engineering. Ground improvement: preloading, drains, compaction, soil replacement, stone columns, grouting. Reinforced earth retaining walls. Slope stabilization – anchors. Selection of special topics in geotechnical engineering. Term project using finite element software.	
267-190502	**SOLID WASTE MANAGEMENT**		**5**
	Specialty (Th/Tut)	**Aim:** This module provides students with an understanding of technical issues and the management of solid wastes.	
		Content: Introduction to solid waste management, Sources, quantities and composition, Legislation, regulation and control, Anaerobic Digestion, Anaerobic Digestion of Municipal Solid Waste (MSW), Composting, Incineration, Reuse and recycling, Recycling technologies, Waste management behaviour (people),Industrial solid waste (audits, minimisation), Waste composition and stabilisation behaviour, Landfill site design and management, Risk assessment of landfills, Pollution from landfills, Leachate fate, attenuation and treatment, Industrial waste strategies, Municipal Solid Waste (MSW) strategies, Decision Support Systems (DSS) for MSW, Solid waste issues in emerging and developing countries.	
267-190503	**REINFORCED CONCRETE I**		**5**
	Core (Th/Lab)	**Aim:** The aim of the course is to transfer to the students the basic knowledge the mechanical properties and applications of reinforced concrete, giving particular emphasis in the design methodology of the buildings core such as slab, beams and columns.	
		Content: Design and analysis of reinforced concrete sections at the ultimate limit state against axial load, flexure and shear. Reinforcement detailing. Design of beams and columns.	
267-190504	**GEODESY**		**5**
	Core (Th/Lab)	**Aim:** This course aims to get the students acquainted with the basic principles and concepts of Geodesy	

		Content: Introductory and fundamental concepts of Geodesy. Surfaces and measurement reporting systems. Design Scales of Topographic Charts. Measurement units of lengths, angles, areas and volumes. Fundamental problems of geodesy. Polygonometry. Installation, measurement and calculation of polygonal routes. Reference systems and introduction to Satellite Geodesy	
267-190505	**RESEARCH METHODS**		**5**
	General Background (Th/Tut)	**Aim:** The course provides the ability to be designed a representative research of environment or a study and demonstrates it in a text or a presentation. The data will be collected using the appropriate sampling methods according to the type of environment, the required information and the frequency of monitoring project. In addition, this knowledge will help the graduate to write, prepare the diploma thesis and in academic life, studies and texts to be structure and presented.	
		Content: Sampling methods according to the type of environment. Samples. Representativeness of samples. Sampling error. Project structure analysis, necessity and utility. Instructions for Authors. Scientific sources of relevant information. Use of bibliography. Sections and contents of the study's text. Presentation of scientific work / Creation of a poster. Power Point use. Data and results Management, Ethics and Intellectual Property. Plagiarism.	
267-190506	**WATER SYSTEMS AND WATER TREATMENT**		**5**
	Specialty (Th/Lab)	**Aim:** The aim of the course is to provide students with an understanding of the labor market requirements at the level of study of residential water supply networks (Water abstraction - Interior - Exterior - Aqueduct - Water purification) as well as at the level of construction of relevant projects.	
		Content: Water abstraction and abstraction - water quality. Determination of water needs of settlements. Study of water supply projects (external aqueduct, gravity and pumping water - volume of tanks - storage - distribution networks (closed - radial - open). Design - dimensioning - hydraulic calculations. Improvement of water quality - sedimentation - The elaboration of a topic related to water supply planning - dimensioning applications, water quality improvement methods - case study in Greece and the technical and economic evaluation of water improvement methods.	

14.6 6th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190601	**PROJECT MANAGEMENT II**		**5**
	Specialty (Th/Tut)	**Aim:** The purpose of this course is to familiarize students with the responsibilities of Greek Public Work Client's Superior and Managing Authorities during the execution of public works construction contracts.	
		Content: Project Management on behalf of the Client: Legal framework for the execution of Greek Public Works - Construction Supervision. Remeasurement. Activity Certification and Payment. Quality Control. Damages and Defects. Project Handover - Contract Management. Contractual Budget. Change Management: Variation orders, New Unit Rates, Supplementary Contracts and Extensions of Time. - Claims Management. Disputes Resolutions.	
267-190602	**BRIDGE ENGINEERING**		**5**
	Specialty (Th/Tut)	**Aim:** The purpose of this course is to familiarize students with the fundamentals of bridge engineering concepts in order to be able participate in the designing, constructing and quantity surveying of several types of bridges.	
		Content: Bridge types, aesthetics, loads, design criteria, bridge components, bearings, expansion joints, preliminary bridge design, construction methods, constructability, estimation of the construction costs, design concepts of green bridges	
267-190603	**GEOGRAPHICAL INFORMATION SYSTEM**		**5**
	Specialty (Th/Lab)	**Aim:** The main aim of the course is to provide an overview of the potentials of digital dynamic mapping. It also aims to manage data and to map it. The purpose is to use maps as means of decision making.	
		Content: Data collection tools, geocoding, data organization, use of related software,user-based mapping.	
267-190604	**HYDROLOGY**		**5**
	Core (Th/Tut)	**Aim:** The aim of the course is to provide students with an understanding of the subject of hydrology, the basics of ground water hydraulics, and to familiarize and work on basin and general hydrology studies	

		Content: Hydrological Cycle, Measurement - Calculation and Analysis of Rainfall (Precipitation), Evaporation and Evapotranspiration, Infiltration, Catchment and Runoff Models, Coefficient of Runoff, Concentration Time, Hydrographs of Runoff, Unit Hydrograph, Flood Design, Sustainable technologies for the design of construction projects based on hydrological data. Assignment related to a series of exercises in the above topics that the course deals with.	
267-190605	**GEOGRAPHICAL INFORMATION SYSTEM**		**5**
	Specialty (Th/Lab)	**Aim:** The aim of the course is to provide students with the ability to design studies and supervise the construction of rainwater and wastewater networks.	
		Content: Sewer networks (Introduction - Pantower and Separate Sewerage System). Sewer network mapping (horizontal mapping). Elevation of pipelines. Calculate the discharge of impurities for each section of the pipeline. Calculation of the cross-section of conductors. Rainwater Networks. Rainwater mapping (horizontal mapping). Elevation of pipelines. Calculation of the flow of a catchment, rain intensity. Groundwater penetration, pumping of waste water. Drainage ducts (Tube types. Cross sections. Conductor strength testing). Construction (Transportation of materials, excavation, slope mounting - piping - excavation - construction problems). Maintenance (cleaning methods - security video surveillance systems). Ancillary technical works (wells - wells - pipettes). Estuary technical works. Elaboration of a topic related to a series of exercises in the above topics that the course deals with.	
267-190606	**GEOGRAPHICAL INFORMATION SYSTEM**		**5**
	Core (Th/Lab)	**Aim: :** the aim of this course is to leverage opportunities from the digital revolution to enable improved and sustainable management of natural resources by addressing challenges across the entire information supply chain, including social, technical and informational aspects.	

		Content: Information and Computer Science: basic concepts, properties and types of data and information, knowledge production mechanisms, presentation of European Union Environmental Information Systems, environmental data collection, distribution, storage, use, and monitoring of the environment, quantitative data analysis with Microsoft Excel and the United States Environmental Protection Agency (U.S. EPA) ProUCL software package. Environmental Information Systems: Presentation of the ENVIROSOFT Environmental Information System and the CHERRY Environmental Grid Computing System. Information systems and Database management: Data processing data entry, data models, database systems, information systems, presentation of applications of geographic information systems (GIS) and in their use in environmental science. Information and Communication Technologies (ICT) and the Environment: computer networks, key concepts, environmental ICT applications, selected services, Web and information retrieval, relational database and data organization, data protection, database design, database management, types of data communication. Environmental Informatics Case Study: The case of West Thessaloniki. Laboratory: use of Microsoft Excel and the United States Environmental Protection Agency (U.S. EPA) ProUCL software package for applications and approaches of environmental information systems. Creating and Managing an Environmental Database Using Microsoft Access.	

14.7 7th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190701	**SMART CITIES**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of this course is to introduce to the students the ideas about how computers, computation, and electronic communications are being rapidly introduced into the fabric, operation and design of the contemporary western city.	
		Content: Introduction to the concept and dynamics of smart cities and the role of urban technologies: understanding the term "smart city" by presenting examples of smart cities, Information and Communication Technologies (ICT) and smart cities. Presentation of National, European and International applications, surveys, studies and guidelines for smart cities, smart city design and structure (classification of Smart Cities and smart city standards and indicators), smart cities examples. The process of innovation and the model of technology transfer in the city: the three levels of a smart city, activities that determine the development path of the city, institutional mechanisms for social cooperation for learning and innovation and digital innovation support tools and applications that create a virtual information and knowledge management environment. Challenges, hurdles and engines of innovation in a smart city: key technologies used in the development of digital applications, technical network infrastructure and components that make communication possible (fiber optic, wireless infrastructure, connections, access points, application platforms), the innovative services offered by Smart Cities with the local economy, strategies for developing successful integrated services across the six pillars (smart economy, smart mobility, smart environment, smart citizens, smart living and smart governance). Analysis and Study of Smart Cities based on planning and organizing good practices. Laboratory Exercises for the course: study and evaluate an example city that has developed a smart city strategy, technology/application creation of digital urban space and smart city structure and architecture.	
267-190702	**COASTAL ENGINEERING**		**5**
	Core (Th/Tut)	**Aim:** The aim of the course is to provide students with an understanding of marine wave mechanics, coastal hydrodynamics and coastal processes as well as familiarity and work on issues related to the study and design of port and coastal protection projects	

		Content: Theory of gravity sea-waves - Wave propagation in shallow, deep and intermediate waters. – Formation of the waves on the shores: shoaling effects, refraction, diffraction - reflection, wave breaking, wave run up - Generation and development of wind waves - prognosis. Statistical study of stochastic waves- Types of port works (parallel and perpendicular to the shore) Breakwater - Moles - Bridges - Seawalls – Hydrodynamic loads on submerged body of pipes and front levels – Dimensioning and control of stability of port structures. Projects with vertical or/and sloping fronts (sea walls and inclined breakwaters). - Theories of coastal matter transport. - Morphological interactions from coastal technical projects. Exercises and Case Study.	
267-190703	**POLLUTION AND POLLUTION CONTROL TECHNOLOGIES I**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to provide students an introduction to issues related to environmental pollution, with emphasis on causes, pathways, risks, mitigation, prevention and pollution control.	
		Content: Introduction to pollution and the sources of pollution. Standards and legalization. Health and environmental effects of pollution. Air pollutants; particulate, SOx, NOx, and organic vapors. Air pollution control. Treatment of industrial wastewater. Handling of solid waste. Monitoring of pollutants.	
267-190704	**LIQUID WASTE PROCESSING AND MANAGEMENT**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to give students an understanding and the ability to write the technical description and calculations of the design of the sewage treatment plant design, as well as their familiarity with the management issues of urban sewage disinfection - sludge management.	
		Content: Water Pollution (water quality - forms of pollution - pollution of rivers, lakes, groundwater - pollution control - sewage decomposition. Installations - Wastewater treatment. Mechanical cleaning (gravel - cultivator - sand collector - sedimentation). (biological filters, chillers, biological towers and trays). Active sludge method, ventilation, oxidation ditches. Nitrogen and phosphorus control and removal. Sludge treatment. Digestion tank. once the operation of waste water treatment (Primary - Secondary - Tertiary treated sewage) and disinfecting sewage additional the sludge management.	
	ELECTIVE 1st		
	ELECTIVE 2nd		

14.8 8th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190801	**PHYSICAL OCEANOGRAPHY**		**5**
	Core (Th/TuT)	**Aim:** The aim of the course is to provide students with an understanding of the parameters of seawater and sea water masses, marine hydrodynamics and coastal processes and to familiarize students with environmental issues related to marine environment.	
		Content: Introduction to the marine environment - Introduction to Descriptive Oceanography - Physicochemical parameters of water - Temperature - Salinity - Pressure - Density - Seawater masses - Water types - Mixing of seawater masses. Sound and Light in the Marine Environment. Introduction to Dynamic Oceanography - Hydrodynamic Circulation. Sea currents Coriolis force, Wind currents, Geostrophic currents, Density currents, Inertia currents, Tidal currents. Upwelling and Downwelling of water masses - Marine Waves. Linear Wave Theory – Shoaling effects - Refraction, Diffraction, Reflection, Wave Breaking. Astronomical Tide. Transport of matter in the marine environment. Models - Mathematical Simulation. Preparation of exercises on the above issues as well as presentation and application of measuring instruments in the field.	
267-190802	**ENVIRONMENTAL IMPACT STUDIES**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to provide students with an understanding of the relationship between technical projects and the environment and the need for sustainable development and management of natural resources. Moreover, the aim for the students is to become familiar with the European and Greek institutional framework for environmental protection, to assess the environmental impacts of infrastructure construction, know the legislation, stages and content of Environmental Impact Assessments, and write Environmental Impact Assessments for infrastructure projects.	

		Content: Environment. Natural resources. Sustainable development and management of natural resources. European and Greek institutional framework for environmental protection. Natural environment and human activities. Pollution, environmental pressures from construction works. Environmental Impact Assessment. Environmental Impact Studies. Necessity and Legislation. Stakeholders. Stages (Planning Approval, Approval of Environmental Terms) and content of Environmental Impact Assessment. Examples of Environmental Impact Assessment. Environmental Impact Assessment Applications for Infrastructure Projects. Preparation of an environmental impact study on an infrastructure project.	
267-190803	**POLLUTION AND POLLUTION CONTROL TECHNOLOGIES II**		**5**
	Specialty (Th/Tut)	**Aim: T**he purpose of this course is to give the students an overview of air, noise, solid, waste, hazardous waste, and also radioactive pollution including methods for, prevention, control, measures and management of the pollution.	
		Content: Classification and characterization of air pollutants, effects of air pollution, meteorology, factors to be considered in industrial plant, location and planning, noise pollution – sources, measurement units, effects and control, sampling and analysis control. Classification and characterization of water pollutants, water chemistry, water microbiology, water quality and control, water distribution and water treatment, wastewater flows, characteristics and treatment. Solid and hazardous wastes, municipal solid waste management, hazardous waste treatment and disposal, special waste management, legal requirements.	
267-190804	**BUSINESS ADMINISTRATION AND ENTREPRENEURSHIP**		**5**
	General Background (Th/Tut)	**Aim:** The aim of this course is for the student to understand the basic principles of business administration and operation, the role of human resources for the successful running of a business, to understand the difference between a simple executive and a leader, to recognize the competitive advantage of innovation, to develop a systematic approach to identifying business opportunities and to combine sources and information from a more internationalized environment and to explain the relative application of innovative products and services in the scientific field of environmental engineering.	

		Content: Business Organization and Management: Introduction to the concept of business organization and management, contemporary forms of organization, organizational structures, the role and mission of management and the evolution of management function and theories of management , the nature of administrative work and the roles of executives, administrative structures, the culture and style of administration - management and leadership, management and entrepreneurship. Business principles : The nature, evolution and growth of the business, business types, the theory of business, business functions, business environment - evaluation of economic conditions, business and market - the business and industry of environmental engineers. Business and innovation development: definitions of sources and types of innovation, innovation and creativity processes, methods and tools for enhancing innovation and creativity, innovation in Greece, business concept and business model, business plan (Development – Evaluation). Analyzing and Studying examples of Innovative Businesses: examples, good practices of planning and organizing innovative businesses. Laboratory Exercises study and evaluate an example of business organization and management, business plan development and evaluation applications and implementation and evaluation of innovative business.	
267-190805	**RENEWABLE ENERGY SOURCES**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to provide students with an understanding of the subject of Renewable Energy Sources and the acquisition of the ability to identify the source of renewable energy from where it can be used in real life, as well as the promotion at the level of study-implementation by the help of an assignment that will they will have to work on.	
		Content: Introduction, definitions. Environment and energy. Basic principles of renewable energy. Biomass - Biofuels. Solar energy utilization systems. Passive-Active Systems, Photovoltaic, Bioclimatic. Wind power. Small hydroelectric systems. Geothermal. Energy saving pinciples. Standard energy applications (desalination, autonomous energy systems, solar cooling). Dimensioning of RES systems. Environmental impacts from renewable and conventional energy sources. Elaboration of a topic related to a series of exercises in the above topics that the course deals with.	
	ELECTIVE 3rd		

14.9 9th Semester Courses

CODE	COURSES	COURSES DESCRIPTION	ECTS
267-190901	**GROUNDWATER HYDRAULICS AND HYDROGEOLOGY**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to provide students with an understanding of the subject of ground water hydraulics and hydrogeology and to familiarize them with the methods of calculating various problems related to these subjects.	
		Content: Introduction to ground water hydraulics, Water movement in underground aquifers. Water movement and transport phenomena in porous media and underground aquifers. Watershed elements, definitions, types of aquifers. Methods for solving equations of ground water hydraulics. Transport mechanisms in ground water hydraulics. Special topics.	
267-190902	**AQUATIC ECOSYSTEMS**		**5**
	Specialty (Th/Tut)	**Aim:** The aim of the course is to give an overview of aquatic ecosystems, marine and fresh water, as well as to make a first distinction between natural and artificial. An important element of the course is the analysis of indicators for the ecological assessment of these ecosystems	
		Content:General characteristics of aquatic ecosystems, lake ecosystems, river ecosystems, marine ecosystems, aquatic artificial ecosystems, ecological Indicators and ecological quality, prevention actions, rehabilitation actions.	
267-190903	**REINFORCED CONCRETE II**		**5**
	Core (Th/Tut)	**Aim:** The purpose of this course is to familiarize students with the production, design and construction of advanced building materials like high performance concrete	
		Content: High performance concrete (production, applications, design, quality assurance). Design of reinforced concrete structural elements against flexure, shear, torsion. structural control. Reinforcement detailing	
	ELECTIVE 4th		
	ELECTIVE 5th		
	ELECTIVE 6th		

14.10 Elective Courses

SECTOR OF STRUCTURED ENVIRONMENT AND MANAGEMENT			
CODE	**COURSES**	**COURSES DESCRIPTION**	**ECTS**
267-191001	**RISK MANAGEMENT**		**5**
		Aim: To allow the student to proceed deeper into project planning (scheduling and Cost) in order to learn methods for optimization of plans taking into consideration risk management and analysis techniques	
		Content: Schedule optimization, Budget optimization and investment evaluation, Risk Management, Definition of risks (SWOT analysis, Delphi method), Risk Analysis (Monte Carlo, PERT).	
267-191002	**NATURAL DISASTER MANAGEMENT**		**5**
		Aim: The aim of this course is to provide the students with the basic conceptual understanding of disasters, also to understand approaches of disaster management and to build skills to respond to disaster.	
		Content: Definition and types of disaster: Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. Man-made disasters: Terrorism, gas and radiations leaks, toxic waste, disposal, oil spills, forest fires study of Important disasters, mitigation and management techniques of disaster, training, awareness program and project on disaster management. Study of Important disasters:Earthquakes and its types, magnitude and intensity,drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g) Earthquakes, Landside). Social Economics and Environmental impact of disasters. Mitigation and Management techniques of Disaster: Basic principles of disasters management, Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warming Systems, Building design and construction in highly seismic zones, retrofitting of buildings.	
267-191003	**NATURAL HAZARDS**		**5**
		Aim: The aim of this course is to introduc to the students to natural disasters and their phenomenon, ground deformations, land-level changes, event recurrence intervals, associated environmental and depositional changes, sedimentation patterns, and all the related hazards.	

		Content: Introduction to hazards and their direct or indirect relevance to human and nonhuman communities. Extraterrestrial hazards: asteroids, bolides, radiation events, and solar storms. Geo(logical) hazards: those that arise mainly from processes in the solid earth. Hydro-meteorological hazards: associated with processes in the coupled hydrosphere-atmosphere system. Biological hazards: pandemics, rodents, insects, algae-bloom, extinction. Chemical hazards: changes in major flows of the ELSS leading to changes in the composition of atmosphere, ocean, soil, water (including pollution, acid rain, ocean acidification, change of greenhouse gases). Technological hazards: accidents, mal-function, Artificial Intelligence, nanotechnology. Social hazards: involuntary migration, unrest, racism, genocide, wars, imperialism, failed governance. Economic hazards: depressions, bubbles, speculations, peak-oil, etc.	
267-191004	**ARCHITECTURE OF PHYSICAL AND STRUCTURED ENVIRONMENT**		**5**
		Aim: The aim of this course is to impart knowledge of contemporary theories and trends in architecture through the examples of emerging building typologies.	
		Content: Overview of world architecture since 1970 with the study of Late Modernism, Post Modernism and Deconstructivism. Theories governing contemporary architecture through case studies, evolving architectural trends and their impact on urban built environment. Emerging building typologies with emphasis on residential developments, offices, skyscrapers, institutional and public buildings. Evolving building materials and technologies, contemporary approach towards disaster mitigation in the built environment. Energy efficient and built environment with emphasis on the use of energy simulation modeling embodied energy estimation and application of governing codes, viz., LEED and ECBC in contemporary buildings.	
267-191005	**ENERGY DESIGN OF BUILDINGS**		**5**
		Aim: The aim of this course is for the student to gain the ability to independently and creatively identify and evaluate different energy conservation measures for a building through systematic analysis and simulation of the building's energy performance**.**	
		Content: The course covers energy conservation measures for buildings. Generalenergy efficiency and environmentally friendly measures in different parts ofa house are at the basis of studies. The course continues with students obtaining general knowledge of approximating energy consumption in buildings depending on their design and equipment, outdoor climate, indoor conditions, HVAC systems, etc. Afterwards, energy performance simulations are conducted using computer software to investigate the current situation of the building and the effects of implementing energy efficiency measures. Up to date energy efficient building concepts, such as Near Zero Energy buildings and Passive houses, are finally introduced.	

267-191006	**BUILDING MATERIALS AND INDOOR ENVIRONMENTAL QUALITY**		**5**
		Aim: The aim of this course is to provide the fundamental information about indoor environmental quality (IEQ) investigations, to be able to report results and to make recommendations for solutions for IEQ problems in residential buildings.	
		Content: Introduction to Indoor Environmental Quality: Discuss the History of Indoor Environmental Quality, recognition of the related associations and agencies, definition of indoor environmental quality; the concept of permissible exposure limits,identification of what Bioaerosols are and their importance to IEQ. Introduction to the essentials for healthy homes: Recognition of the link between housing and health, recognition of certain groups are at greater risk for adverse health effects, identification of the basic public health and housing principles, recognition of that the "Healthy Homes" movement is a holistic approach to promote health through better housing, recognition of the codes and regulations as tools that can help to achieve healthier housing in a community. Introduction to Health Effects - Start with People: comparing methods for interviewing occupants, identify routes of exposure, recognition of health effects, recognition of the signs and symptoms of housing related disease, determination of how to identify housing conditions that may affect health. The house as a System: recognition of the many different types of houses, identification of the different types of systems in homes, recognition of the factors that affect the health of home. The seven principals of healthy housing.	
267-191007	**MATHEMATICS III**		**5**
		Aim: The course aims to introduce the basic ideas and techniques of linear algebra and differential equations, and their applications to environmental engineering.	
		Content: Linear Algebra: Matrices and vectors. Systems of linear equations. Determinants. Vector spaces and subspaces. Eigenvectors, eigenvalues. Differential equations: 1st and 2nd order differential equations. Newton's differential equations and their applications. Linear differential equations and 1 st order systems, with constant coefficients.	
267-191008	**QUALITY MANAGEMENT AND ASSURANCE**		**5**
		Aim: The aim of this course is to allow the student to become familiar with the principles, system of values, standards and methods behind quality control and assurance in construction projects by making full use of human resources, considering client-user needs and optimizing the performance of contracting companies.	
		Content: Quality in construction, Quality Management Standards, Quality Management Systemns, Quality Control, Certification, Accreditation, Total Quality Management.	

267-191009	**INSPECTION, MAINTENANCE AND REHABILITATION OF STRUCURES**		**5**
		Aim: The aim of this course is for the students to understand the role of inspection, the various concepts of repairs, rehabilitation and retrofitting of structures.	
		Content: Maintenance and repair strategies: Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of distress and deterioration of concrete- Evaluation of existing buildings through field investigations, Seismic evaluation of existing buildings. Serviceability and durability of concrete: Quality assurance for concrete construction concrete properties – strength, permeability, thermal properties and cracking. – Effects due to climate, temperature, chemicals, corrosion – design and construction errors – Effects of cover thickness and cracking. Materials and techniques for repair: Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, ferro cement, Fibre reinforced concrete. Rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, Gunite and Shotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning - Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coating and cathodic protection. Repairs, rehabilitation and retrofitting of structures: Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure - Special techniques for structural Retrofitting (Bracing, Shear walls, Base isolation etc). Demolition techniques: Engineered demolition techniques for Dilapidated structures – case studies - Case Studies on Restoration of fire damaged buildings, Case study on repairs and strengthening corrosion damaged buildings; Case study on use of composite fibre wraps for strengthening of building components.	
267-191010	**HEALTH AND SAFETY AT WORK**		**5**
		Aim: Thε aim of this course is to teach the principles, concepts and legislation for Health and Safety of Workers.	
		Content: Introductory concepts. The accident and its announcement. Accident statistics.Institutions and authorities for the health and safety of workers at international, European and Greek levels. Legal framework for hygiene and safety at work. Workplace specifications. Workplace labeling. Harmful risk factors in the workplace. The noise. The lighting. The chemical agents. The asbestos. The fire. Electricity. The heat. The radiation. The mice. Stagnant waters. Paints and solvents. The tar and its derivatives etc. Personal protective equipment. Specifications of personal protective equipment. Obligations of all factors. The update and the employee training. Personal protective equipment for the respiratory system, eyes and face, head, hands, lower limbs etc. The written occupational risk assessment, evaluation and identification of control measures. Occupational diseases and	

		diseases. REACH and CLP regulations on chemicals.	
267-191011	**ART AND TECHNOLOGY**		**5**
		Aim: the aim of this course ia for the students to interpret the relationship between Technology and Art, Technology and to understand the influence of technology in various art forms.	
		Content: Introduction to the historical approach between Technology and Art. The development of digial technologies and the presentation of new forms of art. Reviewing the development of various technologies and their impact on development in the arts, and examining socio-cultural considerations and their impact on the uses of technologies, aesthetics, pedagogy and curriculum in New Media contexts. The role of virtual reality in art. Technology and art as forms of creative activity in the structure and development of society.	
267-191012	**PROJECT PLANING AND MANAGEMENT SOFTWARE APPLICATIONS**		**5**
		Aim: The aim of this course is to present the theory, methods and quantitative tools used to effectively plan, organize, and control projects.	
		Content: Introduction to Project Management, What is a project, What is project management, Required project management skills, Project management phases, Templates in environmental engineering project management, environmental engineering software development process models, Software project management templates, software development process models and software life cycle. Basics of MS-Project software, simple project examples, Introduction to the arched network method, Introduction to the node networks method, Resolving / Finding the critical path, Time Limits - minimum and slower times, Introduction to the PERT method and examples, Combined exercises of the previous methods with the introduction of uncertainties in project implementation (eg over time implementation). Introduction of human resources, working hours,Introduction of human resources costs, fixed costs of activities,Analysis of useful metric costs per activity / project, project evaluation,Project optimization - cost / time, cost / resource combinations,Real-time project analysis, complexity analysis - example of a realistic IT project.	
267-191013	**SUSTAINABLE DEVELOPMENT**		**5**
		Aim: The course will provide the modern aspects on sustainability due to urgent current status of the quality of the global environment. The pylars of sustainable development under national and international priorities analyse in order the knowledge will take into account in any project of a Environmental Engineer.	

		Content: Theory: Sustainability Concept & Its Principles. Institutional Sustainability Frameworks, Green and Blue Development. Environmental Sustainability. Natural environment. Urban environment and its ecological dimension. Limits to good living. Value of free urban space. Restoration of degraded areas. Suitability of use of vegetation in relation to lighting, shading, reduction of pollutants and rain amounts, recreational areas, etc. Financial Sustainability. Circular Economy. Social Sustainability. Educational and Cultural Sustainability. Assessment of Sustainable Development Goals. Laboratory: Development of a short projects on a subject of the Sustainability.	
267-191014	**ENVIRONMENTAL ROAD CONSTRUCTION**		**5**
		Aim: The aim of the course is to introduce students to the fundamentals of urban transportation planning, to familiarize students with contemporary transportation planning issues and methods of analysis, to present the relationships between transportation and urban land use systems and new tools to address environmental and quality of life impacts of transportation and to show the role of investment decisions (or lack thereof) have been held accountable for increased economic prosperity or spiraling economic decline.	
		Content: Introduction: Role of transportation in the Economic development of Nations, Overview of transport modes, growth trends, National Transport Policy, Transportation planning in the developing world; Fundamentals of transportation , Principles of planning, evaluation, selection, adoption, financing, and implementation of alternative urban transportation systems; formulation of community goals and objectives, inventory of existing conditions; transportation modeling trip generation, distribution, modal choice, assignment. Data Collection And Inventories: Collection of data – Organization of surveys and Analysis. Demand and Supply planning : Planning for sustainable urban mobility, positive and negative externalities in urban transport, congestion pricing, parking policy, demand management, Urban travel and transportation system characteristics - a systems perspective, Data management and use in decision making , Demand analysis , Urban activity analysis, Supply analysis; Plan Preparation And Evaluation: Travel Forecasts to Evaluate Alternative Improvements, Impacts of New delopment on Transportation Facilities. Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis. Metropolitan Cities: Design issues in urban mobility, integrating land use and transport planning; Overview of urbanization process, city structure and urban activity and infrastructure systems, Economic and social significance of urban infrastructure systems; Transport's Role in tackling Social Inclusion, Economic Impacts of Transport Policy.	

167-191015	SPATIAL AND URBAN PLANNING		5
		Aim: the aim of this course is to provide an overview of the various fields within planning, such as housing, community development, transportation, environmental planning, urban sprawl and growth management.	
		Content: Urbanization and current urban trends. Planning Theory and urban design. The legal basis, politics and social issues in planning. The comprehensive plan and tools of land use planning. Role of outside investments and forces beyond local control. Urban Design. Urban renewal and community development. Transportation planning. Economic development planning. Growth management and sustainable development. Environmental and energy planning. Planning for metropolitan regions. Planning in other nations.	

SECTOR OF HYDRAULIC AND GEO-ENVIRONMENTAL ENGINEERING			
CODE	**COURSES**	**COURSES DESCRIPTION**	**ECTS**
267-192001	**NUMERICAL METHODS AND MATHEMATICAL MODELS IN HYDRAULIC PROJECTS**		**5**
		Aim: The aim of the course is to provide students with an understanding of the numerical methods of calculating various problems in hydraulics and hydraulic projects as well as their familiarity with the structure and application of mathematical models to hydraulic problems	
		Content: Elements of numerical analysis (numerical interpolation, numerical integration, solving equation systems, Fourier series, finite difference method). Study of differential equations (introduction, parabolic equations, hyperbolic equations - method of attributes, elliptic equations). Application to closed-flow flows (continuous flow in pressure networks - Cross method, non-constant flow - Hydraulic water-hummer). Applications in open conductor flows (constant non-uniform flow, non-constant mathematical simulation, flood wave transmission). Applications in porous media flows. Applications to diffusion-dispersion problems. Introduction to Finite Differences and Finite Element Method. Mathematical Models - Applications.	
267-192002	**ENVIRONMENTAL GEOTECHNICAL ENGINEERING**		**5**
		Aim: This course is intended for introductory in soils anf geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Fundamentals of pollutant transport mechanisms (advection, diffusion, dispersion) related to air, water and ground media. Gaussian plume dispersion models, Lagrangian	
267-192003	**RIVER TRAINING**		**5**
		Aim: The aim of the course is to provide students with an understanding of the design and construction of river training projects.	
		Content: Calculation and flow measurement - development of river hydraulics (rivers and streams) as well as the problem of transport of matter transport in a river (the problem of erosion) - Stairways – River Training (materials-type of slope and bottom protection works). Assignment related to the study of a river basin and the river training. Assignment related to a series of exercises in the above topics that the course deals with.	
267-192004	**ENVIRONMENTAL MICROBIOLOGY AND BIOTECHNOLOGY**		**5**

		Aim: The aim of this course to provide to the students the microbial processes in the environment, microbial communities and microbial interactions and the development, use and regulation of biological systems for remediation of contaminated environments and for environment-friendly processes.	
		Content: Introduction to environmental microbiology and biotechnology. Microbiology: Structure and activities of microbial communities, Microbial interactions and interactions with macroorganisms, Population biology of microorganisms, Microbes and surfaces, microbial community genetics and evolutionary processes, Global) element cycles and biogeochemical processes, microbial life in extreme and unusual little-explored environments. Biotechnology: biotechnology and waste, pollution control, bioremediation, environment and energy.	
267-192005	**ENVIRONMENTAL MANAGEMENT OF PORTS AND COASTAL AREAS**		**5**
		Aim: The aim of the course is to provide students with an understanding of coastal and port environmental management projects.	
		Content: Coastal erosion and deposition of material on the shore - response measures - Renewal of waters of coastal zones and ports - Coastal matter (sand) transport – Pollution Transport in the marine environment – Interaction between coastal structures and coastline, Impact of constructions and coastal - marine environments. Assignments-exercises on the abovementioned topics.	
267-192006	**ECOTOXICOLOGY**		**5**
		Aim: The aim of the course is to give the students knowledge and skills that allow an overall assessment of the fate of foreign chemicals in the environment and of their effects on different biological organisation levels.	

		Content: Environmental chemistry: This part comprises an overview of different chemical groups of anthropogenic origin present in the environment. Focus is on their sources and fates in the environment. Effects of anthropogenic chemicals: This part comprises negative effects of chemicals on different biological organisation levels (cell, organ, organism, population, ecosystem) with focus on mechanisms. An experimental study is carried out. Hazard assessment: This part comprises retrieval and critical evaluation of toxicological information from different sources (internet-based databases, hand books, scientific articles etc.) for classification and labelling of chemicals. The students perform an individual project on classification and labelling of chemicals dangerous for the environment according to EU guidelines. Environmental risk assessment: This part comprises environmental risk assessments of chemicals and is done as projects.	
267-192007	**HYDRODYNAMIC PROJECTS**		**5**
		Aim: The aim of the course is to provide students with an understanding of the construction and design of hydrodynamic dam - works as well as their familiarity and work on relevant topics of study of such projects.	
		Content: Introduction (General issues, types of dams). Solid gravity dams (forces, resistance to overturning and sliding, forces in the base of the dam, heat hydration, cooling of concrete, construction). Hollow gravity dams (types, advantages-disadvantages). Buttress dams (types, wall and buttresses). Arc dams Earthfill dams (types of earthfill dams, failures, type-height of dam, width of crest and foundation- inclination of dam slopes- core, filters, protection of slopes, foundation in rock and sand, calculation of filtration). Rock Fill.	
267-192008	**LAND RECLAMATION**		**5**
		Aim: The aim of the course is to provide students an understanding of the demands of the market at the level of study of irrigation networks (individual-collective), drainage networks as well as at the level of construction of the above networks.	

		Content: The first part provides the necessary introductory concepts and knowledge about the needs of water crops, the movement of water in the soil, the water potential of the soil and the water available to plants. The second part examines the collective irrigation networks with a timetable and free demand with an emphasis on irrigation networks (Design - Benefits - Dimensioning - Hydraulic calculations - Securing required hydraulic load). At the same time, extensive reference is made to the operation of the pumping stations. The third part deals with the drainage networks (open conductor networks at the level of layout - dimensioning). Elaboration of a topic related to the study of irrigation network in plots.	
267-192009	**CLIMATE CHANGE AND IMPACT**		**5**
		Aim: The aim of this course is to enhance awareness of climate change security implications through acquisition of basic knowledge related to global warming as a phenomenon and a security threat multiplier, the main factors which affect the environment, and the impact of climate change on international peace and security in short, mid and long term period.	
		Content: Point main climate change characteristics – causes, impacts, scenarios, direct and indirect impacts; State the main international strategies, policies and actors in the field of Climate Change; Summarise the nexus between Climate Change and Security considering the impact of climate change on international peace and security, and implications on the military activities; Point the main EU strategies, policies and actors in Climate Change mitigation and adaptation; Explain the impact of climate-driven, man-made and natural disasters on security; Links the main direct and indirect impacts with CSDP/CFSP; Describe the EU organizational structures, mechanisms and instruments for international cooperation in disaster response, including Union Civil Protection Mechanism (UCPM), the Integrated Political Crisis Response Arrangements of the Council of the EU and the European External Action Service (EEAS) structures; Outline the EU integrated approach in early warning and building resilience; Explain the relevance of co-operation and networking with the various actors in the field.	

267-192010	**MANAGEMENT OF MARINE PROTECTED AREAS**		**5**
		Aim: The main purpose of the course is to give an overview of marine processes, emphasizing the Mediterranean marine ecosystem. Based on the categories of marine ecosystems as defined by European and international legislations, the pressures and measures proposed are analyzed.	
		Content: Types of marine ecosystems, protected Mediterranean ecosystems threats and pressures, mild anthropogenic actions farms, protection measures environmental awareness, ecosystem-friendly actions and exploitation.	
267-192011	**HEAT AND MASS TRANSFER**		**5**
		Aim: The aim of the course is for the students to understand the mechanisms of heat transfer under steady and transient conditions, the concepts of heat transfer through extended surfaces and to learn the thermal analysis and sizing of heat exchangers and to understand the basic concepts of mass transfer.	
		Content: Free and Forced Convection – Hydrodynamic and Thermal Boundary Layer. Free and Forced Convection during external flow over Plates and Cylinders and Internal flow through tubes. Nusselts theory of condensation – Regimes of Pool boiling and Flow boiling. Correlations in boiling and condensation. Heat Exchanger Types – Overall Heat Transfer Coefficient – Fouling Factors -Analysis – LMTD method – NTU method. Basic Concepts – Diffusion Mass Transfer – Ficks Law of Diffusion – Steady state Molecular Diffusion – Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy -Convective Mass Transfer Correlations.	
267-192012	**PHOTOGRAMMETRY - REMOTE SENSING**		**5**
		Aim: The aim of the couese is for the studenta to understand basic photogrammetric & remote sensing techniques, to be able to perform basic photogrammetric office computations, to apply photogrammetry information to professional surveying services and to demonstrate an appropriate mastery of the knowledge, techniques, skillls and modern tools of photogrammetry.	

		Content: Procedures and methods used for deriving metric information from photographs, analog processes for using aerial photographs in production of topographic maps, flight planning, and cost estimation in aerial mapping work. Introduction to photocoordinate measurement devices and their calibration. Mathematics of modern photogrammetry. introduction, photos vs. maps, aerial photography and cameras. Scale and relief displacement. Parallax, stereo viewing. Coordinate transformations. Collinearity, relative orientation, strip/block adjustment. Aerotriangulation, bundle adjustment. Absolute orientation, mapping. Stereoplotter evolution, Digital Terrain Models, GPS-IMU, LIDAR. Soft copy photogrammetry, digital image products. Aerial Digital cameras, project planning, remote sensing.	
267-192013	**EXPERIMANTAL FLUID MECHANICS**		**5**
		Aim: The objective is the contact of the student with the experiment, i.e. with the experimental arrangement, the measurement and analysis of experimental data.	
		Content: Introduction. Dimensional analysis, Buckingham Π-theorem. Non – dimensional Navier-Stokes equations, characteristic dimensionless numbers. Full (dynamic) and partial (kinematic or geometric) similarity. Reynolds and Froude similarity. Theory and implementation of hydraulic laboratory models. Measurement of density, kinematic viscosity and hydrostatic pressure of liquids. Static flow pressure measurement. Velocity measurements. Pilot tube. Discharge measurement in pipes and open channels. Error analysis, experimental error estimates. Statistical analysis of experimental data. Turbulence theory, response of measuring devices, spectra and data acquisition in turbulent flows, Nyquist theorem, measurements. Laser Anemometry. Hot-wire anemometry. Techniques: LIF (laser-induced fluorescence), PLIF (planar LIF), PIV (particle image velocimetry). Visit to hydraulics laboratory. Display of the use of measurement devices as well as experiments from Diploma and Masters Theses. Experiment on energy losses in pipe flow. Experiment of velocity measurement with Pitot tube. Measurement of the velocity distribution along the axis and across a turbulent air jet with Pitot tube. Experiment in an open channel. Free surface profile and hydraulic jump measurement. Use of sharp crested weir and sluice gate for flow control. Experiment of the discharge	

		time of a tank.	
267-192014	**UNSTEADY FLOWS**		**5**
		Aim: The objective of this course is to introduce the students to the water-hammer phenomena (both in theoretical and applied level).	
		Content: Unsteady flow in closed conduits. Equations of motion-Continuity equation. Hydraulic water-hummer. Sudden-slow-partial flow interruption. Flow interrupts in non-uniform channel. Kinematic waves. Flood waves. Bergeron's method. Method of characteristics. Wave propagation on flows with a free surface. Unsteady flow in open channels. Slowly-rapidly varied flow. Applications-Exercises. Special topics.	
267-192015	**EXPERIMENTAL ROCK MECHANICS**		**5**
		Aim: This course is intended for introductory in soils anf geotechnical engineering taken by virtually all civil engineering majors.	
		Content: Origin and composition of rocks. Geomorphology and geological structures. Engineering properties of rocks. Mechanical behavior of rocks discontinuities. Rock mass classification systems. Mechanical behavior of rocks mass. Hoek & Brown failure criterion. Rock slope stability – landslides. Rock mass permeability. Permeability field testing. The role of geology in the design and construction of dams and tunnels.	
267-192016	**NATURAL ARTIFICIAL ECOSYSTEMS**		**5**
		Aim: The aim of this course is to introduce the students to natural and artificial ecosystems, their functions and the differences between these two ecosystems	
		Content: Introduction to natural ecosystems and artificial ecosystems. Natural vs. Artificial Ecosystems. Types of Natural Ecosystems: aquatic ecosystems (freshwater,transitional communities, marine), terrestrial ecosystems (Forest, Desert, Grassland, Mountain). How ecosystems work.	