UNIVERSITÀ DELLA CALABRIA

UNIVERSITÀ DELLA CALABRIA
DIPARTIMENTO DI
INGEGNERIA PER L'AMBIENTE
E IL TERRITORIO
E INGEGNERIA CHIMICA

The University of Calabria

The **University of Calabria** (**Unical** for short) is a medium-sized university with about **30,000 students enrolled, 808 academics, 739 technical and administrative staff**.
It is situated in Southern Italy and its particular architecture is due to the co-operation between two well known architects - the Italian architect Vittorio Gregotti and the Danish one Martensson.
Since its establishment in 1972, Unical has been vesting with wider and more challenging responsibilities than those traditionally assigned to a university: first to stimulate and then to join in with the dynamic and sustainable positioning of the region within the national economic and social context, perfectly in line with the "profile" that new universities were required to adopt at an international level.

The profile of Unical was created around the concept of the Campus which could facilitate integration and cultural exchange and was, and still is, conceived as a large laboratory of ideas and inspirations that have left their mark, thereby moulding the University's special character. It was built with very large spaces stretching **over 200 hectares of land**, and with buildings developed on a total covered area of **400,000 square meters**.

Unical offers the following facilities: Health Service Centre, Bank Agency, Postal Office, Library (one of the largest libraries in Southern Italy offering a wide range of materials in three different sectors: scientific, humanistic and social-economic); Sports Centre; Centre for Arts, Music and Performance; Language Centre; several interdepartmental centres equipped with computer labs and internet points; cafeterias and dining facilities; university bookshop; newsagent's; tobacconist's; photocopy shop; a university Catholic Chapel; 5,000 parking lots; two theatres (200 and 700 seats); two movie theatres (250 seats each); two amphitheatres for outdoor events; a gym and a day nursery.

Residential Centre

The **Residential Centre** is the structure that manages accommodation, services and leisure facilities for students in order to guarantee the student's right to study. The main services offered by Unical's Residential Centre are:

- **Scholarships**. Each year, the Residential Centre delivers about 2,400 scholarships worth a total of over € 7.5 million.
- **Degree Awards**. Each year, the Residential Centre delivers about 250 degree awards for a total expenditure of € 400,000.
- **Additional scholarships for international mobility**. Each year, 60 extra funds are granted to international mobility (study abroad) for a total expenditure of € 100,000.
- **Residential service. The Residential Centre offers more than 2,300 students and university staff accommodation**. International students who actually reside at the residences of the campus is about 22% (equal to 440 students). By September 2016, the availability of accommodation places for students has been increased from the current 2,300 to 2,700.
- **Food service**. University canteens provide every year 800,000 quality meals.
- **Other services**. Mobile services (shipping) students - Bike Sharing Services - Laundry services - Services of porters and security – Contributions to educational travel - Social and cultural activities with a rich program of initiatives promoted by students.

Internationalization

Since its very beginning, Unical has clearly set out the strategies for the development of its international dimension, as the following data clearly show: **225 cooperation agreements with universities from all over the world and over 300 Bilateral Agreements, in Europe, in the framework of Erasmus Plus**. For this reason, **Unical has been awarded by EU with the "Erasmus success stories" as best practice**.

Moreover, 350 EU and extra EU students per year have the opportunity to study abroad; 160 exchange international students come to Unical.

In the specific, it is important to highlight the **14 dual degrees programs** (Bachelor, Master and PhD), **the Erasmus mobility program, study and placement, the MOST** (program MObility of Students extra EU), **the Erasmus Mundus program of multiple doctoral degree called EUDIME**. Nowadays, **800 international students**, coming from **65 different countries**, live on Campus. Unical offers **125 scholarships** per year to international students who, holding a Bachelor Degree, wish to be enrolled in a Master Degree course (Second Level Degree). The grants consist of free board and lodging for two years plus a semester at the **Unical Residential Centre**.

Departments

Unical offers five academic areas of studies:

- **Humanities**
- **Economics and Social Sciences**
- **Engineering**
- **Sciences**
- **Pharmacy, Nutritionaland Health Sciences**

It is made up of **14 Departments** which offer **77 Graduate Degree Courses** provided at a bachelor and master level. **10 PHD Schools. 28 Post Graduate Masters. 125 Research Labs. 210 Class Rooms.**

The Departments' primary aims are to provide top quality degree programs and to develop advanced scientific research. Each Department, headed by its own Director, is responsible for establishing the Degree courses to be provided according to national legislation requirements and for coordinating and promoting the scientific research activities developed also by producing reports on the results obtained for each project that has been completed. The Departments are:

- **Department of Biology, Ecology and Earth Sciences (DiBEST)**
- **Department of Chemistry and Chemical Technology (CTC)**
- **Department of Economics, Statistics and Finance (DESF)**
- **Department of Pharmacy, Health and Nutritional Sciences**
- **Department of Physics**
- **Department of Civil Engineering**
- **Department of Informatics, Modeling, Electronics and System Engineering (DIMES)**
- **Department of Mechanical, Energy and Management Engineering (DIMEG)**
- **Department of Environmental and Chemical Engineering (DIATIC)**
- **Department of Linguistics and Educational Science**
- **Department of Mathematics and Computer Science**
- **Department of Business Administration and Law (DiScAG)**
- **Department of Political and Social Sciences (SPeS)**
- **Department of Humanities**

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Department of Environmental and Chemical Engineering (DIATIC)



The **Department of Environmental and Chemical Engineering (DIATIC)** is composed by **46 professors and researchers**, **18 technical-administrative units** and **several PhD and postdoc students**.
With **more than 3,000 m2 of laboratory space**, and all main research equipments available within the UNICAL facilities, DIATIC proves a well-recognized **expertise in the field of**:

- **Soil Conservation**
- **Water Resources Management**
- **Renewable Energy**
- **Climate Change Effect Mitigation**
- **Brownfield Remediation**
- **Membrane Technology**
- **Integrated Membrane Systems for Process Intensification**
- **Membrane Contactors systems including Membrane Distillation- Crystallization**
- **Electrochemical Membrane Processes**

Master's Degree in Environmental Engineering



GENERAL FEATURES

The Master's Degree in Environmental Engineering is designed to form a professional able to face and solve not only consolidated environmental problems but also those that are assuming increasing importance. It refers, first, the effects of climate change and, in particular, to changing natural conditions which both environmental engineers and the whole of society will face to, than to increasing pressure on natural resources, which reflected in their changed availability in addition to an increasing deterioration of their quality. Particular emphasis is given to the ability to evaluate the side effects that the implementation of a work or action may have on the environment in order to remove or mitigate them.

Environmental Engineer because of the expertise gained in the environmental field, is able to conceptualize, plan, design and manage systems, processes and complex and/or innovative, with reference both to more traditional areas to the most innovative, such as soil conservation, management of water resources, identification and use of energy resources, treatment of polluted bodies, interactions between environment and settlement processes, modelling hydrogeological, environmental monitoring, civil protection.

EDUCATIONAL & PROFESSIONAL OBJECTIVES

The Master's degree in Environmental Engineering aims at training professionals with an understanding of the technical-scientific aspects of general engineering as well as more specific understanding of topics relevant to Environmental Engineering. The main objective is to enable graduates to approach and resolve complex problems efficiently in an innovative and multidisciplinary manner.
In particular, the Master's Degree aims at forming modern and multidimensional professionals who:

- **can effectively analyse the territory and model its natural processes**
- **manage territorial development, thus being able to foresee the effects that human impact may have on the environment and territory**
- **are familiar with basic materials and design criteria for developing civil infrastructures and industrial plant**
- **understand natural processes and the environmental effects of these infrastructures**
- **can evaluate and model structure-environment exchange processes, thus coping with effects of resource utilisation and waste production on the territory**
- **can qualitatively and quantitatively evaluate the environmental risk caused by natural phenomena as well as industrial development**
- **can develop systems to monitor and control environmental quality and safety**
- **understand techniques for the management of limited resources**
- **are familiar with techniques for mitigating natural and industrial risks, through pollution management and regulation and are able to model and evaluate the effectiveness of these actions**
- **can work with other professionals to establish a unitary and dynamic knowledge for managing the complex relationship between**

To this aim, the framework of the Master's study in Environmental Engineering is diversified into different branches of environmental engineering which allows students to follow their personal interest in:

- **environmental protection from floods, landslides and earthquakes**
- **monitoring and management of environmental quality**
- **management and development of territory**
- **use of advanced computer systems for risk mitigation**
- **use of advanced cartographic tools and geographical information systems (GIS)**
- **designing plants for treatment, management and recycling of fluid and solid waste**
- **designing methods for the protection of soil and natural water systems**

providing tools to analyze territorial and environmental processes and to cope with them at different scales of interest.

The typical professional fields for graduates in Environmental Engineering are the management of natural and industrial risks, basic and applied research, advanced design, planning and programming, management of complex systems, both in the professional and in the manufacturing field or in services and in public administration.

EDUCATIONAL TRAINING

Planning of the new degree course has focused on the following qualifying points:

- **greater connection between undergraduate and graduate degrees, also in light of the experience gained so far**
- **enhancement of the basic courses, which in the previous configuration were largely implemented in the first two years**
- **a better characterization than other degree courses of the same class**
- **a balanced structure which allows a free choice among the options that will be present in the graduate degree**
- **a substantial reduction of the fragmentation of courses through a reduction of examinations and by supporting the creation of a modularity of 6-12 credits that makes the training organization more compact**

The teaching regulation of the study course and the training offer will enable students to follow training courses which provide appropriate amounts of credits in parallel and integrative fields not considered among the characteristic ones.

REQUIREMENTS

Students who possess curricular requirements and have suitable personal knowledge can enrol in the Second Level Degree Course in Environmental Engineering. Any curricular supplements must be fulfilled before the personal knowledge assessment test.
To obtain the Master's Degree in Environmental Engineering students are required to pass the Bachelor final. To access to Bachelor final students who must have awarded the total of credits required in the Educational Plan, except for credits to be awarded for the Bachelor final, and provided that they have paid all tuition fees.

Graduates have access to First and Second Level Postgraduate Courses, PHD Courses, Schools of Postgraduate Studies, Advanced Education Courses.

METHODS OF ASSESSMENT

Exams can include either oral, or written and oral tests. If grading is required, assessment of students' performance is expressed through a Pass Grading on a 30 point scale. Students will pass the exam if the grading obtained is no lower than 18/30. Upon unanimous judgment of the Examining Board, students can be awarded a vote of 30/30 with distinction.
Grading for the assessment of students performance for learning activities other than courses may not require the awarding of marks, in such cases, only a successful completion assessment is awarded to students.
On average, at least one exam session is scheduled for each course at the end of the teaching activity and two extra sessions included between the end of the last session of the current academic year and the beginning of the teaching activities of the subsequent academic year.

Students who are regularly enrolled, have paid tuition fees and who are in line with course attendance levels, can sit for the performance assessment of all attended learning activities. In each session, students who have regularly paid tuition fees can sit for exams with no restrictions in number whatsoever, provided that they possess a statement of attendance to courses and that such courses are over.

In addition to the more traditional full-time approach to study, a specific part-time educational course has been developed for students. Such course is organized according to an average commitment of students corresponding to the award of 30 credits per year.

STUDY PROGRAMME COURSES - YEAR 2017-2018
MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING

YEAR	SEMESTER	COD.	COURSES	CFU / ECTS	SSD	TAF
I	I	27000186	TERRITORIAL PLANNING	6	ICAR/20	C
		27006240	DESIGN OF STRUCTURES IN SISMIC AREAS	9	ICAR/09	C
		27000194	ENERGY FROM RENEWABLE SOURCES	9	ING-IND/11	AI
		27000064	ELECTRICAL SYSTEMS	6	ING-IND33	AI
	I-II		ELECTIVE COURSES	6		S
	II	27000219	HYDRAULIC CONSTRUCTIONS FOR SUSTAINABLE DEVELOPMENT	9	ICAR/02	C
		27006242	HYDROMETEOROLOGICAL AND COASTAL RISK FORECASTING SYSTEMS	9	ICAR/02	C
		27006857	OPERATING TOOLS FOR HYDRAULIC AND ENVIRONMENTAL STUDIES	6	ICAR/02	C
II	II	27005656	SUSTAINABLE WATER MANAGEMENT	6	ICAR/02	C
SOIL CONSERVATION II	I	27005238	RIVER PROTECTION	6	ICAR/02	C
		27000191	FLOOD RISK ANALYSIS AND MANAGEMENT	9	ICAR/02	C
		27006244	DESIGN OF COASTAL AND RIVER STRUCTURES	6	ICAR/02	A
	I-II		ELECTIVE COURSES	6		S
	II	*27006247*	*DYNAMICS OF SLOPE AND FLUVIAL PROCESSES (IN MODULES)*	9		
		27006309	*FLUVIAL HYDRODYNAMICS*	*6*	*ICAR/02*	*C*
		27006310	*SLOPE STABILITY DESIGN*	*3*	*ICAR/07*	*A*
		27000181	GRADUATION THESIS	18		PF
ENVIRONMENTAL PROTECTION II	I	27006856	PLANNING ACTIONS FOR WATER SAFETY	6	ICAR/02	A
		27006245	PROCESSES FOR POLLUTTANTS ABATEMENT AND MUNICIPAL SOLID WASTES TREATMENT	9	ING-IND/27	C
		27005654	REMEDIATION OF CONTAMINATED SITES	6	ICAR/03	C
	I-II		ELECTIVE TEACHING	6		S
	II	27000241	SUBSURFACE HYDROLOGY	9	ICAR/02	C
		27000181	GRADUATION THESIS	18		PF

YEAR	SEMESTER	ELECTIVE COURSES *		CFU / ECTS	SSD	TAF
II	I-II	27000008	APPLIED GEOLOGY	6	GEO/05	S
		27000193	NOISE AND ELECTROMAGNETIC POLLUTION	6	ING-IND/11	S
		27005633	ENVIRONMENTAL LAW	6	IUS/09	S
		27006855	ECOLOGICAL RISK MITIGATION	6	BIO/07	S
		27000057	REALE ESTATE APPRAISAL	6	ICAR/22	S
		27006938	ANALYSIS AND ENVIRONMENTAL ASSESSMENT	6	ICAR/20	S
		27005661	SATELLITE REMOTE SENSING	6	GEO/11	S

*Please check every year if elective courses shall be held

LEGEND
C = Characterizing Training Activities - Environmental Engineering scope
AI = Similar or Integrative Training Activities
A = Other Training Activities (Other useful knowledge for job placement)
S = Other Training Activities (At the choice of the student)
PF = Other Training Activities (Final test)

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providing tools to analyze territorial and environmental processes and to cope with them at different scales of interest.

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SYLLABUS OF COMPULSORY COURSES (IN ALPHABETICAL ORDER)

Desing of Coastal and River Structures

The course aims to provide knowledge of the main aspects of design of coastal and river structures, of simple and complex design, in order to assess the impact on the hydraulic-environmental aspects, on energy and on economic and financial costs.
Specific skills:

- understanding of the legislative provisions;
- understanding of the hydraulic infrastructure of river and coastal areas;
- understanding of the fundamental elements for the identification of design alternatives;
- detection capabilities of project choice, and the impacts of various possible solutions;
- ability to use the main specialist software;
- basic knowledge of the design of the hydraulic infrastructure of coastal and river areas;
- ability to identify the resolution of management problems through an approach to economy and efficiency;
  Transversal skills:
- skills in problem solving, in particular through the analysis of case studies;
- ability to collaboration and sharing in small groups and presentation of the project work done;
- autonomy in the search for design solutions through the use of the major international software (and then usually in English).

Design of Structures in Sismic Areas

The aims providing with the basic knowledge for a correct structural design in seismic areas. Particular attention is paid to the methodological aspects, dealing with the " Limit State Procedure". Major detail is given with regard to the design of members of reinforced concrete and steel. To consolidate the concepts, a project work is carried out designing a reinforced concrete multi-storey building in sismic area.

Dynamics of Slope and Fluvial Processes

Students must acquire knowledge of the dynamics of fluvial and slopes processes. In particular, the knowledge of the turbulence in open channel flow. Knowledge about the river basins dynamics with particular reference to the sediment transport mechanisms, local scour and the stability of the slopes. The theory is aimed at the ability to apply the analysed procedures (estimation of solid transport and scour, evaluation of fluvial dynamics and the stability of the slopes) to real case studies, taking into account the total geomorphological and hydrological dynamics of the basin. The course is designed to make students able to deal with real-life study cases for the design of the most appropriate engineering solutions to mitigate the hydrogeological risk of watercourses and slopes.

Module of Fluvial Hydrodynamics

Students should acquire knowledge and skills which extend and strengthen those achieved in the first cycle of study in the field of Hydraulics and Hydraulic Constructions, broadening them in the context of Fluvial Hydrodynamics. They should acquire the ability of applying their knowledge and skills to the solution of problems also complex about the motion of flows in rivers and channels, also with water-sediments interaction, including the design of hydraulic works. At the end of the course, students should be able to communicate clearly and in an unambiguous way their knowledge, with the relevant hypotheses and limits, and the possible conclusions on the basis of the available data, to both a specialists and ordinary audience, through written technical reports on the practical activities and exercises. They should have increased the learning ability, as much as to continue studying in an autonomous, mature, critical manner.

Module of Slope Stability Design

Students must acquire knowledge and skills for the proper execution of a detailed study on potentially landslined slopes.
They have to mature the ability to recognize the different types of landslide movements, as well as the choice of suitable layering works.
They will have to be able to interpret aerofotogrammetric (also drone) and topographical elaborations for a correct evaluation of the shape and geometry of the slopes, as well as geological and geotechnical elaborations for the volumetric dimensioning of hydrogeological failure phenomena.
They must have developed those learning abilities that enable them to continue studying independently, maturly and critically.

Electrical Systems

The course aims, building on the Principles of Electromagnetism learned during the modules of Physics, Electrical Systems module aims to give students the basic knowledge of electrical engineering and then address the issues associated with electric machine and electric systems for energy. The goal is to help students deal with other disciplines such as application provided by the order of studies and who need basic knowledge of electrical systems.
Circuit Theory: fundamental concepts. Steady-state regime. Steady-state regime. Dynamic-state regime. Analysis of networks. Power factor correction. Three-phase systems. Power systems in the symmetrical three-phase and balanced. Aron. Symmetrical and Unsymmetrical three-phase networks. Mechanical and Electromagnetic Fundamentals. AC Machine Fundamentals. Transformers, single-phase and three-phase. Transformers in parallel. Synchronous Machines. Asynchronous machine. General composition of the power network, Generation, Transmission, Distribution and Utilization. Elements of electrical safety.

Energy from Renewable Sources

The aim of the course is to provide all the information needed to develop and to design systems that use renewable energy. In particular, are presented the main technologies that employ solar radiation for the production of thermal energy, photovoltaic systems for the production of electricity; wind systems for the exploitation of wind energy, and finally are presented geothermal systems that use the ground as a heat source. The course will provide the main sizing methods of these systems, the criteria to evaluate the useful energy produced and, finally, the methods for economic optimization.

Flood Risk Analysis and Management

Learning outcomes: Give knowledge and skill for the analysis of basin scale hydraulic risk and for the design of flood control structures.

Hydraulic Constructions for Sustainable Development

The course should enable students to produce a conceptual design of the common hydraulic engineering Structures based on approaches adequate to achieving a sustainable development of the territory.

Hydrometeorogical and Coastal Risk Forecasting Systems

An effective and sustainable strategy of defense from hydrometeorological and coastal risk should include procedures to reduce dangerousness and vulnerability. Planning and realization of structural works, while being the primary means to reduce the risk, involve economic and social costs that grow significantly when the level of residual risk decreases. These costs can never be finally voided respecting reasonable constraints of sustainability and without accounting for economic, environmental, territorial and cultural aspects. Conditions of acceptable risk are linked to the realization of nonstructural works, which reduce the vulnerability of the territory. Among them, forecasting systems allow to obtain a reliable framework prediction of the temporal evolution of the calamity and represent a support tool to the alert procedures and for Civil Protection.
Learning outcomes expected by students are:

- can apply their hydrologic, hydraulic and geotechnic knowledge and understanding, and problem solving abilities in new or unfamiliar environments in the multidisciplinary context of forecasting systems;
- have the ability to integrate knowledge and handle complexity in the context of forecasting systems, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments (e.g. risk planning and disability);
- can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously;

have the learning skills to allow them to continue to study in a manner that may be largely selfdirected or autonomous.

Operating Tools for Hydraulic and Environmental Studies

The course aims to provide the student with the basics for the development of numerical algorithms needed to solve advanced hydraulic and environmental problems. The student must be able to understand the link between the engineering nature of problems, their mathematical formulation, and their numerical resolution by means of computers.
The student should be able to use algorithms and routines and the calculation procedures introduced in the course, even in conjunction with problems of different nature.

Planning Actions for Water Safety

Natural water treatment techniques are particularly technically interesting because, generally, they are characterized by low environmental impacts, if compared to technologically advanced solutions, and by low investment and management costs. Therefore, the advantage of such techniques is to be more easily included in sensitive environmental contexts or as integration of advanced technological solutions as well as being more widely accepted by the Authorities and the population.
The aim of the course is to provide the state of the art of the best sustainable techniques for water detection and treatment.

Remediation of Contaminated Sites

The objective is to provide to the students the main elements to understand the soil pollution phenomena, to conduct the sites characterization, to design and execute the remediation treatments.

River Protection

Starting from the most engineering issues posed by the European (Water Framework Directive 2000/60/CE) and National (Norme in Materia Ambientale d.lgs. n°152/2006) current regulations, the course aims at providing the knowledge and the hydraulic expertise in the context of conservation of the river environments within the river basin management plant. Among the main purposes of the course, there are the understanding of the interconnection between qualitative and quantitative aspects of a river basin, the river restoration designs and bioengineering projects, the environmental impacts assessment of the traditional hydraulic fluvial works on the river basin. The issues discussed within the course are organized in such a way to make the student able to judge the suitability of the Water Conservation Regional Plans and to prepare the Water-Basin Management Plans according to the methodologies suggested by the European and National current regulations.

Subsurface Hydrology

The student at the end of the course should have knowledge of the topics covered in order to be able to understand the phenomena associated with the groundwater, their causes and mechanisms that underlie them. In addition, the student must be able to: make a complete mathematical description of the phenomena of flow and transport in porous media, being able to clearly identify assumptions, boundary conditions and characteristic properties of soil; apply the concepts learned during the course in carrying out any kind of exercise proposed in relation to the course program; make the necessary decisions needed to properly frame the phenomena related to groundwater flow and transport and to identify the most appropriate model to simulate forcing effect on it; speak with a technical language suitable for the correct exposure of groundwater hydrology arguments.

Sustainable Water Management

The course aims to provide knowledge of the main aspects of sustainable management of water resources, of simple and complex water systems, in order to assess the impact on the hydraulic-environmental aspects, on energy and on economic and financial costs.
Specific skills:

- understanding of the legislative provisions and programmatories;
- understanding of the structure of an Integrated Water System;
- understanding of the fundamental elements for the identification of design alternatives;
- detection capabilities of project choice, and the impacts of various possible solutions;
- ability to use the main specialist software;
- basic knowledge of the design of the hydraulic infrastructure of integrated water system;
- ability to identify the resolution of management problems through an approach to economy and efficiency.

Transversal skills:

- skills in problem solving, in particular through the analysis of case studies;
- ability to collaboration and sharing in small groups and presentation of the project work done;
- autonomy in the search for design solutions through the use of the major international software (and then usually in English).

Territorial Planning

The course aims to provide students with the tools for taking decisions and assessments on territorial transformation projects, with attention to environment and sustainability issues. The student will be led to develop a critical point of view on urban dynamics. He will learn the conceptual tools needed to understand the issues of urban-environmental redevelopment and the project role in the prevention of environmental risks.

SYLLABUS OF ELECTIVE COURSES (IN ALPHABETICAL ORDER)

Analysis and Environmental Assessment

The course objective is to train the student on environmental issues. The course aims to provide students with the basic elements to address the issue of Environmental Analysis and Assessment and decision-making related to the implementation of projects. The main objective is to provide students with an interdisciplinary approach to complex environmental issues, with a preventive approach, and on the effects that many interventions produce on the environment. The course allows an interdisciplinary approach to the complex environmental issues covered within the EIA and VAS and provides the student with the knowledge to prepare the technical elaborations required under the two different procedures. Regulatory references and methodologies and tools used to carry out environmental evaluations are provided for each field.

Applied Geology

The student shall acquire ability to understand geological problems of territory and knowing of the main methodologies of intervention (for instance the stabilization of a slope, etc.). Such abilities shall be spent also in aid to Geotechnical and Hydraulic applications.

Ecological Risk Mitigation

The introduction to the theory of ecosystem services will enable environmental engineers to conduct impact analysis and project planning through a harmonious interaction with experts specialised in other disciplines.
This will provide engineers with a broad vision of environmental sciences and will ensure that they may achieve an adequate and a wholistic evaluation of the functional potential embedded in the landscape. Through the perception of the functional role of the structure of key ecosystems, engineers will be directed towards environmental engineering solutions that will achieve the maintenance and the restoration of the ecosystem functions that provide the greatest benefits for the community. The introduction to environmental accounting techniques will enable environmental and landscape engineers to achieve a strategical advantage in respect of laureates from other disciplines for what concerns environmental accounting plans recently promoted under the Common International Classification of Ecosystem Services (CICES) of the European Union, supported by Horizon 2020 funding and embedded within the EU Biodiversity strategy to 2020.

Environmental Law

NOT AVAILABLE

Noise and Electromagnetic Pollution

The course aims to train professional competences capable of carrying out investigation sand complex measures in Environmental Acoustics and Environmental electromagnetic pollution produced by non-ionizing sources.

Reale Estate Appraisal

The course aims at providing students with the tool to assess the value of property, plant and companies and to appraisal the costs in construction. Specific aims are: learning the foundations of political economics (microeconomics); understanding the specific context related to real estate and construction processes; learning and applying the principles and procedures of valuation; learning from case history of a cost appraisal. Transversal competences: developing the ability to carry out a practical appraisal; prepare a valuation report (appraising), a feasibility study (counseling) and technical consultancy in civil and criminal matters; Asseverate the code of ethical conduct in the work practise.

Satellite Remote Sensing

The course provides students with advanced knowledge and operational know-how for remote sensing applications from spaceborne Earth Observation platforms. Students will be enabled to design and end-to-endcarry out quantitative analysis of digital satellite data, with geographic outputs to be exploited in thematic cartography applications.