



ALMA MATER STUDIORUM UNIVERSITA' DI BOLOGNA

Second Cycle Degree / Two Year Master in
Offshore Engineering
A.Y. 2018/19



<http://corsi.unibo.it/2cycle/OffshoreEngineering/Pages/default.aspx>

Add value to your M.Sc. Degree: accept the Offshore Challenge

The exploitation of offshore resources will play a strategic role in the future of mankind. The European Union has promoted the “Blue Growth” program to promote the valorization of biotic and abiotic marine resources. A sustainable valorization of renewable and conventional offshore energy resources may give a relevant contribution to balance the overall energy demand. The exploitation of marine bioresources combined to the improvement of coastal infrastructure can be a key to the economic development. Improved offshore technologies will be needed to realize such scenario.

A growing demand for the development and installation of innovative offshore structures, systems and facilities as well as of coastal infrastructures is experienced. Specific technical problems arise when offshore structures and plants need to be designed and installed, also concerning safety and environmental issues that arise when operating in the marine context.

The challenge for a sustainable exploitation of offshore resources requires highly qualified professionals, prepared to operate in an international context, ready to cope with advanced design techniques and to tackle the improvement and optimization of off-shore operations in harsh environments.

The two years Master Program in Offshore Engineering (Laurea Magistrale in Ingegneria Offshore) offered by the University of Bologna was built to meet these needs, forming highly qualified professionals able to work in the framework of design and operation of offshore structures, systems and processes, and mastering the key enabling technologies for the sustainable exploitation of offshore resources.

The program is entirely offered in English. Since the first year, the program offers three different tracks:

- the track addressing **Offshore Energy Technologies**, dedicated to the design and operation of offshore technologies and processes for renewable energies and Oil&Gas, as well as for the exploitation of marine bioresources;
- the track addressing **Offshore Structures**, dedicated to the design, installation, management and maintenance of offshore and maritime structures and systems for the exploitation of fabrication techniques, structures assembling, conventional and renewable energies;
- the track addressing **Environmental Offshore Engineering**, dedicated to the assessment and management of environmental and safety issues in the design and operation of offshore structures, technologies and systems.

The program is promoted in the framework of an intense cooperation with companies active in the offshore sector. The topics of the courses offered were specifically defined to meet both the requirements of a high-ranked engineering preparation and to answer the professional needs of companies.

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The University of Bologna

The institution that we today call the University of Bologna was the first university in the western world, taking shape in Bologna at the end of the eleventh century.

In line with this strong tradition, the University of Bologna is now one of the most important and best reputed amongst Italian universities. Bologna is characterised by the largest Italian medieval historical city centre, and is very friendly to the 80.000 students that constitute the 16% of its population.



The numbers of culture and innovation

85,244: the students who have chosen the University of Bologna, making it the most popular university in Italy. Teaching and extra-curricular activities take place in 1,086,134.88 m² of space in the campuses of Bologna, Cesena, Forlì, Ravenna and Rimini.

11,000: (average) number of research products, **200** patents, **350** funded research projects (VII framework programme and other EU programmes), **7** Inter-departmental Centres for Industrial research (CIRI), **6** national technological clusters of the Ministry of Education; University and Research.

33: the Departments of the University of Bologna.

11: the Schools of the University of Bologna.

9: the Research and Training Centre.

5: the Campuses of the University of Bologna.

215: Degree Programmes: **92** first cycle 3-year programmes, **110** second cycle programmes and **13** single cycle programmes.

71: International degree programmes, 27 of which are delivered in English.

41: PhD programmes, **39** specialisation schools, **66** first and second level professional master's programmes, 16 of which are international.

2,296: international students from abroad on exchange programmes and **2,077** students enrolled at UNIBO who spent a study period abroad in 2016.

The Ravenna Campus: a strong territorial vocation

The first of its kind in the Italian university system, since 1989 the Alma Mater Studiorum has been structured as a **Multicampus**: the Bologna Campus works alongside the Campuses in Cesena, Forlì, Ravenna and Rimini. Every Campus has a **strong territorial vocation** with its own structures and services dedicated to learning activities, cultural and sporting events and associations. Every Campus has Schools, Departments and Local Organisational Units. Every Campus coordinates the services and initiatives supporting teaching and research, actively and organically liaising with **public and private stakeholders**, and therefore represents an essential driver of socio-economic growth in the territory it operates in. Topics of specialization were identified for each of the four Campuses in Romagna.

Ravenna, the natural seat for an Offshore specialisation

Ravenna represents the **tradition and the history of offshore** in the Mediterranean sea. The offshore industry arose in Italy and in Ravenna from gas extraction in the Adriatic Sea, started by ENI in the second half of the 1950s. From then on, Ravenna has become one of the most important **global hub** for Offshore companies, specialised in extraction plants construction and shipyards. Today, companies in the area of Ravenna are **international competitors working in the principal global markets**, such as North and West Africa, Mediterranean countries, North Sea countries, Latin America and Kazakh-



Since 1993, the **OMC Conference & Exhibition** takes place every two years. The OMC is the most important international event dedicated to the world of exploration and production of hydrocarbons on and Offshore and technologies and related services in the Mediterranean.

This is why Ravenna is the natural seat for a new degree in Off-shore. The best combination between **academic training** and **high-level professionalism** is achieved here. On one side there is the University, with its guarantee of excellence in the educational field, and on the other there are the local companies, expression of concrete experience in the sector.

The Master Program in Offshore Engineering is run in collaboration with **Fondazione Flaminia**, a body supporting the development of the Ravenna Campus and promoting synergies between institutions and companies since 1989.

M.Sc. Programme in Offshore Engineering

The two-years International M.Sc. Programme in **Offshore Engineering** is offered by the Department of Civil, Chemical, Environmental and Materials Engineering at the University of Bologna, with the support of companies in the Ravenna Offshore District and of Fondazione Flaminia.

The programme, **entirely delivered in English**, addresses Offshore engineering from three different perspectives: design of offshore processes for the exploitation of energy resources, design of off-shore structures, and environmental issues in the exploitation of offshore resources.

Since the first year, the programme offers three different tracks:

- **Offshore Energy Technologies;**
- **Offshore Structures;**
- **Environmental Offshore Engineering.**

Students must choose the track when enrolling.

In the **first year, at the Bologna Campus**, the compulsory courses (a total of 48 ECTS) deepen the understanding of fundamental concepts in Offshore engineering under the different tracks offered by the Program. A total of 6 ECTS are dedicated to electives and laboratories.

In the **second year, at the Ravenna Campus**, compulsory courses (42 ECTS) focus on specialized topics, such as offshore renewable energies, Oil&Gas upstream processes, offshore operations and technologies, are offered in cooperation with the industrial companies that support the program.

Thanks to an agreement between Confindustria Ravenna and the University of Bologna, students attending the programme are offered the possibility to carry out an internship and to develop a Master's Thesis in the companies operating in the Offshore engineering, Offshore safety and Offshore constructions in Ravenna.

An extended network of collaboration with companies operating in the Ravenna area and in other sites in Italy and abroad, and with international research institutes offering exchange positions for master theses supports the program.

This programme is developed in the context of widely recognised and well-reputed Master's of Science in Engineering: the University of Bologna is one of the best placed amongst Italian Universities.

Prospects

Successful completion of the Program allows graduates to pursue their professional career or continue their academic career.

Among the more important professional sectors addressed by Master studies in OffShore Engineering are:

- the Oil&Gas sector, up-stream and mid-stream, strongly requires qualified engineers for design and operation in a framework of growing complexity and innovation towards increasing sustainability and environmental compatibility;
- the Renewable Energy sector: exploitation of off-shore renewable energies requires specialized design of structures, systems and technologies in a continuously evolving framework;
- the Environmental sector: the marine environment is a fragile ecosystem and the sustainable exploitation of marine energy resources and marine bioresources requires highly skilled professionals able to assess and manage environmental and safety issues;
- the Construction sector: the design, construction and installation of off-shore structures and processes requires to master specific procedures and methods;
- the Marine Biotechnology and Aquaculture sector, with its evolution towards large-scale production, has a growing requirement of qualified engineers able to support the industrialization of off-shore biotechnological processes and their operations;
- for those who want to further study Off-Shore Engineering in an academic context, graduates of this program are eligible to enter into PhD studies.

Within the Program:

- ◆ the Offshore Energy Technologies track aims to train high specialized professionals operating in offshore technologies and processes, able to manage and design systems and technologies for the sustainable exploitation of offshore energy, safe and compatible with the environment;
- ◆ the Environmental Offshore Engineering track aims to train high specialized professionals able to assess and manage environmental and safety issues in the design and management of offshore and maritime industrial and civil works;
- ◆ the Offshore Structures track aims to train professionals with high specialized skills in the design and management of offshore structures. The offshore structures should be safe and compatible with the environment and they are aimed at the sustainable exploitation of renewable and conventional offshore energie

Master of Science in Offshore Engineering “Offshore Structures”

First Year (Bologna Campus)

	ECTS	Term
Mandatory courses		
Numerical Simulation	6	I
Offshore Geotechnical Engineering	9	I
Advanced Structural Mechanics	9	I
Structural Design	9	II
Design Project A	3	II
Management of Design in Offshore Activities	6	II
Materials and Corrosion of Offshore Structures and Equipment	6	II
Electives (6 ECTS)		
Fundamentals of structural mechanics and engineering	6	I
Earthquake Engineering	6	II
Computational Mechanics	6	II

Second Year (Ravenna Campus)

	ECTS	Term
Mandatory courses		
Offshore monitoring and HSE management	12	I
Offshore Oil&Gas Production Technologies and Operations	9	I
Coastal and Marine Fluid Dynamics	6	I
Modelling of Offshore Structures	6	I
Design of Offshore Structures	6	II
Design Project B	3	II
Thesis	18	
Electives (6 ECTS)		
Marine Renewable Energies	6	I
Harbour Engineering	6	II
Naval Engineering and Design	6	II
Internship	6	II

Master of Science in Offshore Engineering

Environmental Offshore Engineering

First Year (Bologna Campus)

ECTS Term

Mandatory courses

Numerical Simulation	6	I
Offshore Geotechnical Engineering	9	I
Petroleum Reservoir Engineering	6	I
Applied Geomatics for Offshore Engineering	6	I
Management of Design in Offshore Activities	6	II
Materials and Corrosion of Offshore Structures and Equipment	6	II
Energy Generation and Environmental Protection	6	II
Laboratory of Energy Management	3	II

Electives (6 ECTS)

Biotechnology for the reclamation of contaminated lands and waters	6	II
Fundamentals of Thermodynamics	3	I
Fundamentals of Unit Operations	3	I
Fundamentals of structural mechanics and engineering	6	I

Second Year (Ravenna Campus)

ECTS Term

Mandatory courses

Offshore HSE Management	6	I
Bioremediation and Exploitation of Marine Bioresources	6	I
Monitoring and Positioning in Offshore Engineering	6	I
Offshore Oil&Gas Production Technologies	6	I
Offshore Renewable Energy Production Processes	6	I
Coastal and Marine Fluid Dynamics	6	I
Harbour Engineering	6	II
Thesis	18	

Electives (6 ECTS)

Laboratory of Offshore Operations	6	II
Algal biotechnology	3	II
Eco-engineering and nature-based solutions for marine infrastructures	3	II
Early warning tools for the biomonitoring of offshore installations	3	II
Naval Engineering and Design	6	II
Internship	6	II

Master of Science in Offshore Engineering

Offshore Energy Technologies

First Year (Bologna Campus)

ECTS Term

Mandatory courses

Numerical methods	6	I
Advanced Thermodynamics	6	I
Advanced Fluid Dynamics	9	I
Design of Offshore Processes	6	II
Offshore Engineering Equipment Design	6	II
Equipment Design Project	3	II
Turbomachines and Offshore generation	3	II
Project Management in Offshore Activities	6	II
Materials and Corrosion of Offshore Structures and Equipment	6	II

Electives (6 ECTS)

Fundamentals of Thermodynamics	3	I
Fundamentals of Unit Operations	3	I
Laboratory of Thermodynamic Simulation	3	I
Laboratory of Advanced Process Simulation	3	I
Process Safety Engineering	6	II

Second Year (Ravenna Campus)

ECTS Term

Mandatory courses

Offshore HSE Management	6	I
Laboratory of Offshore Operations	6	II
Bioremediation and Exploitation of Marine Bioresources	6	I
Ocean Engineering and Marine Renewable Energies	9	I
Oil&Gas Production	6	I
Offshore Oil&Gas Technologies	6	I
Thesis	18	

Electives (6 ECTS)

Coastal Engineering	3	I
Naval Engineering and Design	6	II
Algal biotechnology	3	II
Eco-engineering and nature-based solutions for marine infrastructures	3	II
Early warning tools for the biomonitoring of offshore installations	3	II
Internship	6	II

Admissions to the International Master's programme in Offshore Engineering

In order to apply, students need to comply with the requirements set by the Programme Board, as specified in the Call for applications.

The Call for application is published here:

<http://corsi.unibo.it/2cycle/OffshoreEngineering/Pages/call-for-applications-academic-year-201819.aspx>

Read the Call for Applications on the websites for information on deadlines, registration rules and scholarship opportunities.

A first cycle title ("bachelor") in the corresponding engineering disciplines and a B2 level English proficiency are required.

Pre-Applications possible in the period between January and June each year.

Enrollment in the period between September and December each year.

Classes start in September each year.

Fall Term lasts from September to December,

Spring Term from February to May.

Completion of the Master programme entitles to access PhD studies.

Application

1. Selection process

In order to keep the quality of the educational environment, admission to the Master's Degree Programme is regulated by a selection process that evaluates the applicants' motivation, academic preparation and language ability. It is necessary to possess specific curricular requirements and personal competencies and skills.

For Non-EU citizens, an annual quota of places is set each year by the University of Bologna. For the Programme, in the academic year 2018/2019, a maximum of 50 non-EU students will be accepted.

Please note: no entrance exam nor Italian proficiency test are required

2. Eligibility Requirements

The minimum graduate admission requirement for the Master's Programme is a bachelor's university degree of at least three years in duration, or gained through the acquisition of at least 180 ECTS credits, or other degree from accredited institutions recognized as equivalent. Applicants holding an Italian degree are invited to read the Italian version of the course regulation for detailed indications about the applicant's profile in terms of Italian university credits.

The evaluation of the applications is performed by the Master's Board which decides about eligibility based on the following requirements:

The suitability of the applicants' degree (*curriculum studiorum*); with regards to background knowledge in the subjects related to offshore engineering, as: Fluid dynamics and hydraulics; Thermodynamics; Geotechnical Engineering; Process Engineering; Structural Mechanics; Design.

The suitability of the applicants' personal preparation (*curriculum vitae*);

Proficiency in the English language (level B2 according to the Common European Framework of Reference). If the proof of proficiency (see description below) is not considered to be sufficient, the admission board might decide that an oral test will follow, either face-to-face or via telephone/VOIP.

3. Application Requirements

The following materials must accompany the online application:

- Front and back photocopy of your ID card/Passport or other valid identity document;
- Resumé or Curriculum Vitae, including significant academic/work experiences in the field of the Master's Degree;
- Official transcript copy from every post-secondary institution attended, containing a list of the courses with grades (GPA etc.), the name of the final degree and the final grade;
- Personal statement;

- Proof of English proficiency, i.e.:
 - * Language proficiency test (Idoneità) released by the University of Bologna Linguistic Centre (CLA-UNIBO) or by other Italian Universities;
 - * Internationally recognized language certifications, such as TOEFL, IELTS, etc. (minimum scores to be considered equivalent to B2 level being the following: IELTS 5,5; TOEFL PBT 507-557; TOEFL CBT 180-217; TOEFL IBT 80-99; Cambridge First Certificate (FCE); Trinity College of London ISE II).

Additional documents required for non-EU students:

Two recommendation letters.

In order to apply, prospective students need to register to Studenti Online www.studenti.unibo.it, and select the menu “Register for an entrance exam or requirements check”. [Download the step-by-step guide to the application.](#)

4. Deadlines

The Admission Board will process the application forms in several intakes, according to the rules outlined above, within the following deadlines schedule:

	INTAKE opening	Application DEADLINE	RESULTS	Non-EU applicants	EU applicants
I	Monday, Jan 29th, 2018	Thursday, March 1st, 2018	Thursday, March 15th, 2018	YES	YES
II	Tuesday, March 20th, 2018	Monday, April 23rd, 2018	Thursday, May 10th, 2018	YES	YES
III	Tuesday, May 15th, 2018	Monday, June 11th, 2018	Thursday, June 21st, 2018	YES	YES
IV	Tuesday, June 26th, 2018	Monday, July 16th, 2018	Thursday, July 26th, 2018	YES*, only if pre-enrolled	YES

* Non-EU students can apply ONLY if the positions available for them in the Master's Degree were not fully covered and on condition that they have already submitted their pre-enrolment application to the Italian Embassy/Consulate in their country within due date.

We suggest that applicants, especially non-EU students, apply as early as possible. Early application is also important and for candidates applying for [scholarships offered by University of Bologna](#)

Outcome

If the Admission board deems that an applicant meets the requirements, the application light will turn green on the online system, and an Eligibility letter (Conditional Offer) will be released.

5. After the evaluation

After you have been pre-admitted (Conditional Offer) you will have to prepare for enrolment.

If you hold an Italian qualification: starting from the end of July through the end of December, you will have to complete the enrolment procedure at the University of Bologna through the website Studenti Online.

If you are an international student you shall immediately get in touch with the Italian Embassy or Consulate in your home country and apply to the Pre-enrolment procedure at the University of Bologna, for the given academic year. You should also apply to obtain the "Declaration of Value" (in Italian "Dichiarazione di valore") and the entry Visa for Study reasons (in Italian: "visto per motivi di studio"). Attention should be paid at the deadline, which is strictly fixed, usually in June/July. Students are requested to check the deadline at their Italian Embassy. Also, **EU-citizens** holding a degree obtained in the EU but not in Italy, should be aware that a Declaration of Value is needed to enrol in University of Bologna.

International students are strongly encouraged to read the following webpages:

[Who are international students](#)

[How to prepare for enrolment](#)

[Enrolling with a foreign qualification](#)

General notes that apply to all the enrolments

- During the enrolment phase a final check is made on the eligibility of the applicants.
- Candidates who have not completed yet their first level degree (Bachelor) may apply, but they must graduate by December 31 of the year in which they apply, otherwise their application will be discarded.
- The documentation submitted is subject to the Italian Presidential Decree 445/2000. The candidates must be aware as well of the penalties laid down by the article 496 of the Italian Penal Code in case of false statements and false certifications.

Contacts

For individual advice on the application and personal requests, applicants can get in contact with our staff at: dicam.didattica@unibo.it

For further information on the immigration rules in Italy please contact: internationaldesk.ra@unibo.it

For more details about International Students see the official web page of the [University of Bologna about admission procedures](#) for international students.

The Call for application is published here:

<http://corsi.unibo.it/2cycle/OffshoreEngineering/Pages/call-for-applications-academic-year-201819.aspx>

Enrollment

Students can complete the application for enrollment and pay the fees via [Studenti online](#) on the University website, only after the verification of the admission requirements and the achievement of the pre-admission.

Then students must visit the Student administration office to collect the badge.

The enrollment opens on 26/07/2018.

Tuition Fees

The University of Bologna calculates tuition fees based on students economic situation and on presentation of ISEE (indicator of equivalent economic situation).

Full exemption is granted for ISEE values up to €23,000.00. Above this threshold, the tuition fee increases proportionally to the ISEE value, with special subsidies for the lowest incomes. Assistance is also envisaged for deserving students.

Read the available information about enrolment fees: <http://www.unibo.it/en/teaching/enrolment-transfer-and-final-examination/tuition-fees-and-exemptions/Tuition-fees/Tuition-fees>

Information for non-EU students with residency abroad who wish to enrol in a degree programme at the University of Bologna.

For enrollment, first submit your application for pre-enrolment (Form A) at an Italian Embassy (or Consulate) in the country you live in (only under exceptional circumstances can you contact an Italian Embassy in a third-party country, and in such cases the Embassy may refuse your application).

You must take the following documents to the Italian Embassy:

- the pre-enrolment application (Form A) duly completed;
- two passport photos;
- the documents required for the Visa application;
- a health insurance policy where applicable.

You must obtain the following documents from the Italian Embassy:

- an authenticated passport photo;
- an entry visa to Italy for study purposes (“studio- immatricolazione università”);
- a stamped health insurance policy, where applicable;
- the required documents if you hold a foreign qualification: as the foreign qualification legalised, translated and submitted with a declaration of value

If you are interested in applying for Er.Go. financial aid, (study grants, housing and tuition fee waivers), you must obtain a certification attesting to your family’s income and assets from the Italian Embassy, which has to be translated and legalized. Er.Go. calls for applications will be published in July 2018, but in the meantime you can read about the documents required last year (for A.Y. 2018/19, documents will need to certify your family’s income in 2017).

Study grants and exemptions

Selection of study grants for international students of the University of Bologna.

[Unibo actions 1&2](#)

Study grants and tuition fee waivers for deserving international students who wish to register in First Cycle, Second Cycle or Single Cycle Degree Programmes at the University of Bologna. Apply for Unibo Actions 1&2 calls to get them.

[Collegio Superiore: Selection procedure for the admission of deserving international students](#)

The competition is open to Italian and international students enrolling in the first year of a second cycle degree program or in the fourth year of a single cycle degree program. The Collegio students benefit from free lodging, an annual grant and the exemption from university fees.

[China Association College](#)

Scholarships available each year for the most deserving Chinese students who attend First or Second Cycle Degree Programmes at the University of Bologna.

[Unibo for refugees](#)

A project promoted by the University of Bologna and the Municipality of Bologna for the integration of refugee students at university.

Unless otherwise indicated, international students have access to all study grants, exemptions, prizes and incentives available to University of Bologna students.

[Consult the list of all study grants and subsidies for students](#)

[Joint desk International Desk - ER.GO](#)

International students may contact the desk for information about how to benefit from ER.GO support.

Aims and objectives	Course (alph. order)
<p>This course aim to provide students with advanced tools for analysing and modelling momentum, energy and mass transport in fluid media, as well as to different regimes of fluid flow. Continuum mechanics approach is used to address the discussion of fluid mechanics and heat transfer problems. Successful learner in this course will be able to understand the role of local form of total momentum and energy balance equations.</p>	<p>ADVANCED FLUID DYNAMICS</p>
<p>The course is an extension and intensification of Mechanics of Solids and Structures. The goal of the course is to advance the understanding of structural behavior and enhance the ability to apply classical structural analysis methods to civil engineering systems. The advanced methods for the analysis of structures will be applied to some structural examples, which will be developed by the students.</p>	<p>ADVANCED STRUCTURAL MECHANICS</p>
<p>Knowledge about thermodynamic properties of fluids and materials and their use in phase equilibrium problems. Knowledge about the fundamentals of thermodynamic analysis for energy and process industry applications.</p>	<p>ADVANCED THERMODYNAMICS</p>
<p>The aim of the course is to provide competences on the biotechnological aspects of algal cultivation, which include cultivation methodologies and production process. The student will acquire knowledge on the present production and utilization of biomass from different algal species and will also know the theoretical aspects behind the development of innovative processes.</p>	<p>ALGAL BIOTECHNOLOGY</p>
<p>Through this course, the student acquires knowledge to integrate modern surveying technologies offered by Geomatics for the metrical study of objects, sites, and territory in a consistent way. The student learns the use of space-geodetic techniques suitable for multi-scale measurements (global to local), and thus he is able to integrate in situ observations, airborne surveying and satellite imagery. 3D data acquisition and modeling is in particular discussed, either for environmental applications and for civil and architectural surveys.</p>	<p>APPLIED GEOMATICS FOR OFFSHORE ENGINEERING</p>
<p>The course will provide students with the knowledge of biochemistry, microbiology and bioprocessing required for the sustainable remediation of impacted marine ecosystems (surface and subsurface water and sediments) and the industrial exploitation of marine biodiversity and bioresources.</p>	<p>BIOREMEDIATION AND EXPLOITATION OF MARINE BIORESOURCES</p>

Aims and objectives	Course (alph. order)
<p>The course will introduce and describe the processes that characterize the oceanic environment, as wind, tide, wave and currents, and their loads and interaction with the structures. In particular, the student will be able to analyze the sea conditions (waves, currents).</p>	<p>COASTAL AND MARINE FLUID DYNAMICS</p>
<p>The course focuses on sustainable nature based solutions for beach protection and recovery in the presence of climate change. Students will be introduced to processes that characterize the evolution of the coastal environment and beaches, by considering future climate scenarios and environmental impact assessment. Dune maintenance and recovery, management of freshwater in coastal areas in the presence of salt intrusion and sea level rise, and ecology of beaches will be the main focuses.</p>	<p>COASTAL ENGINEERING</p>
<p>The course is an introduction to computational mechanics of solids and structures. The goal of the course is to provide the students with the fundamental concepts and operating tools to solve current structural problems using computer technology.</p>	<p>COMPUTATIONAL MECHANICS</p>
<p>Introduction to and training in sustainable design of industrial processes in the offshore sector. Application of knowledge in thermodynamics, fluid dynamics, heat transfer, equipment selection to process selection and simulation. Concerted application of skills in the mentioned technical areas in an economical framework while considering environmental, raw-materials and energy availability, as well as safety constraints.</p>	<p>DESIGN OF OFFSHORE PROCESSES</p>
<p>The aim of the course is to provide for the basic and some advanced elements for design of offshore structures. After an extensive illustration of requirements and protocols for certification of steel for construction, the elements of design of steel structures will be given, including strength requirements, instability verification, design of connections (bolted and welded), with particular emphasis to those typical of offshore structures. Criteria for life extension of existing off shore platforms will be also given. In the course the students will develop a structural project related to a simplified off-shore structure, framed structures or lattice systems. The project will be done by the student alone or in small groups, under the supervision of the instructor.</p>	<p>DESIGN OF OFFSHORE STRUCTURES</p>

Aims and objectives	Course (alph. order)
<p>In the course the students will develop a structural project related to framed structures or lattice systems. The project will be done by the student alone or in small groups, under the supervision of the instructor.</p>	<p>DESIGN PROJECT</p>
<p>The aim of the course is to provide the learner knowledge about the environmental biomonitoring strategies adoptable to assess the potential impacts arising from offshore activities (exploration, production and decommissioning), addressing in particular early warning tools.</p>	<p>EARLY WARNING TOOLS FOR THE BIOMONITORING OF OFFSHORE INSTALLATIONS</p>
<p>In the course, the student will know the main aspects of earthquake engineering, and in particular: seismology and hazard, behaviour of structures under earthquake action, with elastic and inelastic behaviour, definition of the seismic action, design methods according to the most important Codes and regulations, detailing. The methods will be described with reference to reinforced concrete, steel and masonry structures.</p>	<p>EARTHQUAKE ENGINEERING</p>
<p>Students attending will learn the most important ecological aspects that need to be taken into account to design “blue” marine infrastructures, and the recent scientific and technological advances towards sustainable waterfront development.</p>	<p>ECO-ENGINEERING AND NATURE-BASED SOLUTIONS FOR MARINE INFRASTRUCTURES</p>
<p>The course provides the basics for understanding the main aspects of modern power systems/smart grids analysis and operation in steady state and transient/dynamic conditions. At the end of the course students are able to understand the main technical problems relevant to transmission and distribution of electric energy, and can solve them with particular reference to load flow, short circuit calculation, stability, frequency control, voltage control and renewable sources diffusion in the electric network and smart grids.</p>	<p>ELECTRIC POWER SYSTEMS</p>
<p>The course is aimed at providing basic principles for design and operation of typical fluid machines used for “island” application in off-shore installations. Elements of Environmental safety in offshore activities will also be provided.</p>	<p>ENERGY GENERATION AND ENVIRONMENTAL PROTECTION</p>
<p>The course aims at introducing the students to the design of process equipment. Criteria and procedures for equipment selection and sizing will be introduced.</p>	<p>EQUIPMENT DESIGN PROJECTS</p>

Aims and objectives	Course (alph. order)
<p>The course provides fundamental concepts of structural design. Theoretical aspects as well as applications are presented, aiming at providing a simple and yet complete overview of the subjects treated. It is especially conceived for students with a background different from Civil Engineering.</p>	<p>FUNDAMENTALS OF STRUCTURAL DESIGN</p>
<p>The course provides fundamental concepts of structural mechanics. Theoretical aspects as well as applications are presented, aiming at providing a simple and yet complete overview of the subjects treated. It is especially conceived for students with a background different from Civil Engineering.</p>	<p>FUNDAMENTALS OF STRUCTURAL MECHANICS</p>
<p>The aim of the course is to provide the student with basic knowledge of the thermodynamic basic concepts relevant in offshore energy production processes.</p>	<p>FUNDAMENTALS OF THERMODYNAMICS</p>
<p>The aim of the course is to provide the student with basic knowledge of the unit operations relevant in offshore energy production processes.</p>	<p>FUNDAMENTALS OF UNIT OPERATIONS</p>
<p>The course focuses on the design and management of coastal structures and harbors, as well as the assessment of their environmental impact and sustainability. Tools for the analysis and design of coastal defenses, onshore approach facilities and harbors (docks, breakwater etc) will be discussed. Student will learn how to assess sea forcings (waves, currents) and design coastal structures in the presence of climate change and human impacted environment.</p>	<p>HARBOUR ENGINEERING</p>
<p>At the end of the course the student has skills on the static and dynamic simulation of chemical processes.</p>	<p>LABORATORY OF ADVANCED PROCESS SIMULATION</p>
<p>The students will learn the importance of energy consumption for environment, especially for its CO₂ emissions, the main cause of climate change. They will understand the challenge engineers have ahead in facing the dichotomy between growing energy consumption, that will rely still for long on fossil fuels, and the urgency to stop CO₂ emission growth. The course will discuss the Kyoto Protocol of 1997 and the COP 21 Agreement of Paris of 2015. They will learn the main tools so far adopted like white certificates, CO₂ emission trading mechanisms and externalities evaluation. All this will be achieved also through class exercises.</p>	<p>LABORATORY OF ENERGY MANAGEMENT</p>

Aims and objectives	Course (alph. order)
<p>The student will be introduced to the main construction and maintenance operations in offshore activities with the aim of understanding the specificities required by offshore operations.</p>	<p>LABORATORY OF OFFSHORE OPERATIONS</p>
<p>At the end of the course the student has skills on the selection of thermodynamic models for process simulation and on the thermodynamic analysis of processes.</p>	<p>LABORATORY OF THERMODYNAMIC SIMULATION</p>
<p>The student will be introduced to the specific framework of the offshore industry, with the aim of understanding the activities required to manage offshore design and construction projects.</p>	<p>MANAGEMENT OF DESIGN IN OFFSHORE ACTIVITIES</p>
<p>The course aims to provide tools and skills for the design and management of ocean structures and the assessment of their impacts. In particular the student will be able to design ocean structures, as offshore structures (fixed and floating) and their interaction with waves. The conversion of energy from the sea (waves and currents) will be treated. The student will be able to perform a simple assessment of the energy resource, and will gain the basic knowledges on the typology of energy converter from the ocean.</p>	<p>MARINE RENEWABLE ENERGIES</p>
<p>The aim of the course is to introduce the student to the metallic materials used for off-shore installations and equipment. Knowledge on construction technologies, corrosion protection and materials for the protection from fire will also be provided.</p>	<p>MATERIALS AND CORROSION OF OFFSHORE STRUCTURES AND EQUIPMENT</p>
<p>In the course, element for modelling of offshore structures will be given. Three main parts of the course will be: equivalent static and dynamic modelling of the actions, including wave action and wind, both in the time and frequency domains; finite element modelling of the structure, stress and displacement recovery and verifications; modelling and verifications against cyclic loadings, with special emphasis to fatigue and damage of metallic materials.</p>	<p>MODELLING OF OFFSHORE STRUCTURES</p>

Aims and objectives	Course (alph. order)
<p>This course provides theoretical and operative knowledges concerning the monitoring and positioning aspects in the off-shore engineering. In particular, different techniques for an accurate positioning based on GNSS technology will introduced both for monitoring of off-shore structures and for geolocalization of off-shore infrastructures. Examples of real applications regarding the monitoring or the positioning of off-shore structures will be discussed.</p>	<p>MONITORING AND POSITIONING IN OFFSHORE ENGINEERING</p>
<p>The aim of this course is to introduce the processes and methods used to design ships and other marine vehicles. Engineering philosophy and design practice will be introduced, and practical experience on the use of CAD and CAM software in marine design will be promoted.</p>	<p>NAVAL ENGINEERING AND DESIGN</p>
<p>A successful learner from this course will be able to: a) deal with numerical analysis topics such as: accuracy, truncation and round-off errors, condition numbers, convergence, stability, curve-fitting, interpolation, numerical differentiation and integration, numerical linear algebra; b) deal with numerical methods for solving ordinary and partial differential equations, with finite difference and finite element methods for parabolic and elliptic partial differential equations, applications of computer programs to case studies.</p>	<p>NUMERICAL METHODS</p>
<p>A successful learner from this course will be able to: a) deal with numerical analysis topics such as: accuracy, truncation and round-off errors, condition numbers, convergence, stability, curve-fitting, interpolation, numerical differentiation and integration, numerical linear algebra; b) deal with numerical methods for solving ordinary and partial differential equations, with finite difference and finite element methods for parabolic and elliptic partial differential equations, applications of computer programs to case studies.</p>	<p>NUMERICAL SIMULATION</p>

Aims and objectives	Course (alph. order)
<p>The course aims to provide tools and skills for the design and management of ocean structures and the assessment of their impacts. The course will introduce and describe the processes that characterize the oceanic environment, as wind, tide, wave and currents, and their loads and interaction with the structures. In particular the student will be able to analyze the sea conditions (waves, currents) and to design ocean structures, as offshore structures (fixed and floating) and their interaction with waves. The conversion of energy from the sea (waves and currents) will be treated. The student will be able to perform a simple assessment of the energy resource, and will gain the basic knowledges on the typology of energy converter from the ocean.</p>	<p>OCEAN ENGINEERING AND MARINE RENEWABLE ENERGIES</p>
<p>The course aims at introducing the students to the design of process equipment. Criteria and procedures for equipment selection and sizing will be introduced. Equipment design techniques will be applied to the more important unit operations used in offshore processes.</p>	<p>OFFSHORE ENGINEERING EQUIPMENT DESIGN</p>
<p>Aim of the course is to provide students with the ability to apply their knowledge and experience of soil mechanics and geotechnical engineering to offshore developments. In particular, the course covers the geotechnical properties of seabed sediments, the offshore site investigation procedures together with the traditional and advanced approaches for the design of a wide range of offshore foundations.</p>	<p>OFFSHORE GEOTECHNICAL ENGINEERING</p>
<p>The aim of the course is to provide specific knowledge on the Health, Environmental and Safety issues in off-shore operations, also focusing on those related to the production of Oil&Gas resources.</p>	<p>OFFSHORE HSE MANAGEMENT</p>
<p>The aim of the course is to provide specific knowledge on the Health, Environmental and Safety issues in off-shore operations, also focusing on those related to the production of Oil&Gas resources. Theoretical and operative knowledge concerning monitoring and positioning in offshore engineering will also be provided.</p>	<p>OFFSHORE MONITORING AND HSE MANAGEMENT</p>
<p>Students attending the course will be introduced to the identification of data collection instruments, to the calculation of required data, and to the planning and design of Oil & Gas production processes (subsea, topside and floating production technologies). At the end of the course, students will also be able to formulate and answer to scientific questions on the topic.</p>	<p>OFFSHORE OIL&GAS PRODUCTION TECHNOLOGIES</p>

Aims and objectives	Course (alph. order)
<p>The aim of the course is to introduce the student to the processes and technologies for the production of offshore Oil&Gas resources. The student will gain knowledge on the offshore upstream operations and on sub-sea, top-side and floating production technologies. Knowledge of offshore maintenance and construction operations will also be provided.</p>	<p>OFFSHORE OIL&GAS PRODUCTION TECHNOLOGIES AND OPERATIONS</p>
<p>The aim of the course is to introduce the student to the processes and technologies for the production of offshore Oil&Gas resources. The student will gain knowledge on the offshore upstream operations and on sub-sea, top-side and floating production technologies.</p>	<p>OFFSHORE OIL&GAS TECHNOLOGIES</p>
<p>The course will address systems for the conversion of energy from the sea (waves and currents and wind) will be treated. At the end of the course, the student will be able to understand the systems for the production of offshore energy, and will gain the basic knowledges on the sizing of offshore renewable energy generation systems.</p>	<p>OFFSHORE RENEWABLE ENERGY PRODUCTION PROCESSES</p>
<p>By the end of this course, students will be able to describe and manage the fundamental engineering principles of the Oil & Gas exploration and production industry, with a specific focus on offshore technologies, and to analyze qualitative and quantitative data. In particular, students will be able to communicate scientific procedures, results, and conclusions using appropriate SI units, language, and formats; and describe, evaluate, and communicate the impact of research and other accomplishments in the broader field of petroleum engineering.</p>	<p>OIL&GAS PRODUCTION</p>
<p>The Course is addressed to provide the basic knowledge of petroleum systems and petroleum engineering, with special reference to exploration, drilling and production engineering. These topics represent strategic elements as far as world energy supply is concerned. The Course is completed with an introduction to the study of petroleum economics, project management and engineering phases of the petroleum industry, with applicative exercises and laboratory practices.</p>	<p>PETROLEUM RESERVOIR ENGINEERING</p>
<p>After the course students will be able to assess the risks due to industrial installations through the application of basic concepts about: classification of hazardous substances, hazard identification, probabilistic assessment of top events and consequence assessment.</p>	<p>PROCESS SAFETY ENGINEERING</p>

Aims and objectives	Course (alph. order)
<p>The aim of the course is to introduce the student to the metallic materials used for off-shore installations and equipment. Knowledge on construction technologies, corrosion protection and materials for the protection from fire will also be provided.</p>	<p>PROJECT MANAGEMENT IN OFFSHORE ACTIVITIES</p>
<p>At the end of the course the student will be able to manage advanced methods for the verification and design of concrete and steel structures. Considered methods are based on rigorous mechanical approach but also simplified models for one- and two-dimensional structures will be practiced. A variety of civil engineering structures will be analysed. The advanced methods will be used to solve some real problems, with reference to European codes. Moreover, the students will develop a structural project related to framed structures or lattice systems. The project will be done by the student alone or in small groups, under the supervision of the instructor.</p>	<p>STRUCTURAL DESIGN</p>
<p>Moreover, the students will develop a structural project related to framed structures or lattice systems. The project will be done by the student alone or in small groups, under the supervision of the instructor.</p>	<p>TURBOMACHINES AND OFFSHORE GENERATION</p>

Companies and Institutions supporting the Off-Shore Engineering programme

