

General information	
Academic subject	<i>Marine Geology</i>
Degree course	<i>Science and Management of Maritime Activities</i>
Academic Year	<i>2021-2022</i>
European Credit Transfer and Accumulation System (ECTS)	6
Language	<i>Italian</i>
Academic calendar (starting and ending date)	<i>October 2021; January 2022</i>
Attendance	<i>Strongly recommended</i>

Professor/ Lecturer	
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Virtual headquarters	
Tutoring (time and day)	<i>By appointment using email address</i>

Syllabus	
<b>Learning Objectives</b>	<p><i>The aim of the course consists in:</i></p> <ul style="list-style-type: none"> <li><i>- providing basic knowledge of Marine Geology, with particular regard to materials and processes affecting the seabed;</i></li> <li><i>- acquiring skills useful for the correct collection of oceanographic data, and for their analysis, processing and representation.</i></li> </ul>
<b>Course prerequisites</b>	<i>Basic knowledge of Earth Science.</i>
<b>Contents</b>	<p><b>INTRODUCTION TO MARINE GEOLOGY</b>  <i>The evolution of the Earth; composition and structure of the Earth; the drift of the continents; paleomagnetism; plate tectonics; the motions of the lithospheric plates and the expansion of ocean floors; diverging margins; converging margins; transform margins.</i></p> <p><b>PHYSIOGRAPHY OF THE OCEAN FLOOR AND BATHYMETRIC PROVINCES</b>  <i>Hypsographic curve. The bathymetric provinces of passive continental margins and converging margins. The significance of the platform / slope / basin systems in geodynamic. The canyons and the continental rise. Mid-ocean ridges. Transform faults and fracture zones. Deep ocean basins: flat and abyssal reliefs, seamount and guyot, pits and island arches.</i></p> <p><b>SEDIMENTS AND SEDIMENTARY TRANSPORT</b>  <i>Characters, classification and distribution of sediments in the seabed (carbonate and siliceous muds, sapropels and black shales, iron sediments, phosphates...). Genesis, classification and properties of sedimentary rocks. Sedimentary processes and tractive and massive transport. Main sedimentary structures.</i></p> <p><b>DYNAMICS AND SEDIMENTARY PROCESSES IN LITORAL AND SHALLOW SEA SYSTEMS. ANTHROPIC IMPACT</b>  <i>Notes on the dynamics of waves, tides and sea currents; dynamics of depositional systems: delta, beach and platform environments. Anthropogenic impact in coastal areas. Case studies.</i></p> <p><b>OCEAN CIRCULATION AND CLASSIFICATION OF DEEP SEA SEDIMENTS</b>  <i>Physical, chemical and dynamic characteristics of ocean waters; thermohaline circulation. Marine depositional systems: slope, turbidites, contourites, hemipelagites, pelagic clays. Deposits of wind and volcanic origin; glacio-marine sediments, sediments of extraterrestrial origin.</i></p>

	<i>METHODS OF INVESTIGATION OF THE OCEAN FLOOR Direct (sampling, surveys ...) and indirect (Side Scan Sonar, Single and Multi Beam, reflection seismic ...) investigation methods.</i>
<b>Books and bibliography</b>	<i>BOSELLINI A., MUTTI E., RICCI LUCCHI F. (1989) - Rocce e successioni sedimentarie. UTET, TORINO DOGLIONI C. (1991) - Una interpretazione della Tettonica Globale. Le Scienze, 270, 32-42. KENNETT J. (1982) - Marine Geology – Prentice Hall, London. RICCI LUCCHI F. (1992)- I ritmi del mare. N.I.S., Bologna</i>
<b>Additional materials</b>	<i>The teacher recommends specific readings on web pages and/or scientific papers and provides slides shown during lessons.</i>

<b>Work schedule</b>			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<b>Hours</b>			
150	48		102
<b>ECTS</b>			
6	6		
<b>Teaching strategy</b>		<i>Lectures, also recorded in e-learning mode. Lectures are supported by seminars and exercises carried out in the classroom on some topics of the course. Lessons, seminars and exercises are followed, where necessary, by a discussion with students in the classroom. During the lessons, powerpoint presentations, diagrams, thematic maps are used.</i>	
<b>Expected learning outcomes</b>			
<b>Knowledge and understanding on:</b>		<i>The student will have to demonstrate knowledge of the fundamental concepts of marine geology, having clear the distribution of sediments and sub-environments in the various areas of the seabed; will have to know the dynamics of sedimentary processes occurring in the marine environment, as well as the different methodologies used for its study. The understanding and possession of the fundamental concepts is a necessary condition for passing the exam.</i>	
<b>Applying knowledge and understanding on:</b>		<i>The student will have to demonstrate knowledge of the fundamental concepts of marine geology, having clear the distribution of sediments and sub-environments in the various areas of the seabed; will have to know the dynamics of sedimentary processes occurring in the marine environment, as well as the different methodologies used for its study. The understanding and possession of the fundamental concepts is a necessary condition for passing the exam.</i>	
<b>Soft skills</b>		<ul style="list-style-type: none"> <li><b>Making informed judgments and choices</b> <i>The student must be able to solve a geological question related to the topics of the course, making the most suitable methodological choices to solve the problem. The demonstration of having good autonomy in this field will contribute to a very positive evaluation of the final exam.</i></li> <li><b>Communicating knowledge and understanding</b> <i>The student must be able to describe clearly and with language properties all the topics covered during the course. Possession of these skills will be reflected in an increase in the final mark, with the possibility of reaching the maximum.</i></li> </ul>	

	<ul style="list-style-type: none"> <li>• <i>Capacities to continue learning</i></li> </ul> <p>The student must be able to independently acquire further knowledge starting from the basis of the contents transmitted during the course, and making connections with other subjects of the course of the Degree Course. The demonstrated ability to autonomously enrich one's knowledge will contribute to a more than positive evaluation of the final exam, up to the achievement of the maximum.</p>
<b>Assessment and feedback</b>	
Methods of assessment	<p>During the course, one or two in itinere tests / verifications may be carried out, relating to the topics covered in class and articulated in the form of questionnaires characterized by open questions and / or multiple answers. The result can be taken into account in the final evaluation.</p> <p>The final exam consists of an oral exam covering all the topics included in the program. The relative evaluation is expressed with a mark out of thirty, with possible honors.</p>
Evaluation criteria	<ul style="list-style-type: none"> <li>• <i>Knowledge and understanding</i></li> </ul> <p>The student will have to demonstrate knowledge of the fundamental concepts of marine geology, having clear the distribution of sediments and sub-environments in the various areas of the seabed; will have to know the dynamics of sedimentary processes occurring in the marine environment, as well as the different methodologies used for its study. The understanding and possession of the fundamental concepts is a necessary condition for passing the exam.</p> <ul style="list-style-type: none"> <li>• <i>Applying knowledge and understanding</i></li> </ul> <p>The student must demonstrate to be able to correctly use the knowledge acquired during the course necessary to describe the geological and sedimentary characteristics of the marine environment and to recognize the dynamics of the marine environment also through examples of results of direct and indirect investigations carried out for the study of different parameters of the seabed. Mastery of these skills is a necessary requirement for passing the exam.</p> <ul style="list-style-type: none"> <li>• <i>Autonomy of judgment</i></li> </ul> <p>The student must be able to solve a geological question related to the topics of the course, making the most suitable methodological choices to solve the problem. The demonstration of having good autonomy in this field will contribute to a very positive evaluation of the final exam.</p> <ul style="list-style-type: none"> <li>• <i>Communication skills</i></li> </ul> <p>The student must be able to describe clearly and with language properties all the topics covered during the course. Possession of these skills will be reflected in an increase in the final mark, with the possibility of reaching the maximum.</p> <ul style="list-style-type: none"> <li>• <i>Capacities to continue learning</i></li> </ul> <p>The student must be able to independently acquire further knowledge starting from the basis of the contents transmitted during the course, and making connections with other subjects of the course of the Degree Course. The demonstrated ability to autonomously enrich one's knowledge will contribute to a more than positive evaluation of the final exam, up to the achievement of the maximum.</p>
Criteria for assessment and attribution of the final mark	<p>The final mark is awarded out of thirty, with the possible achievement of honours. The final exam is passed when the grade is greater than or equal to 18.</p>
<b>Additional information</b>	