

Minor in Blue Economy and Growth

Courses' Catalogue



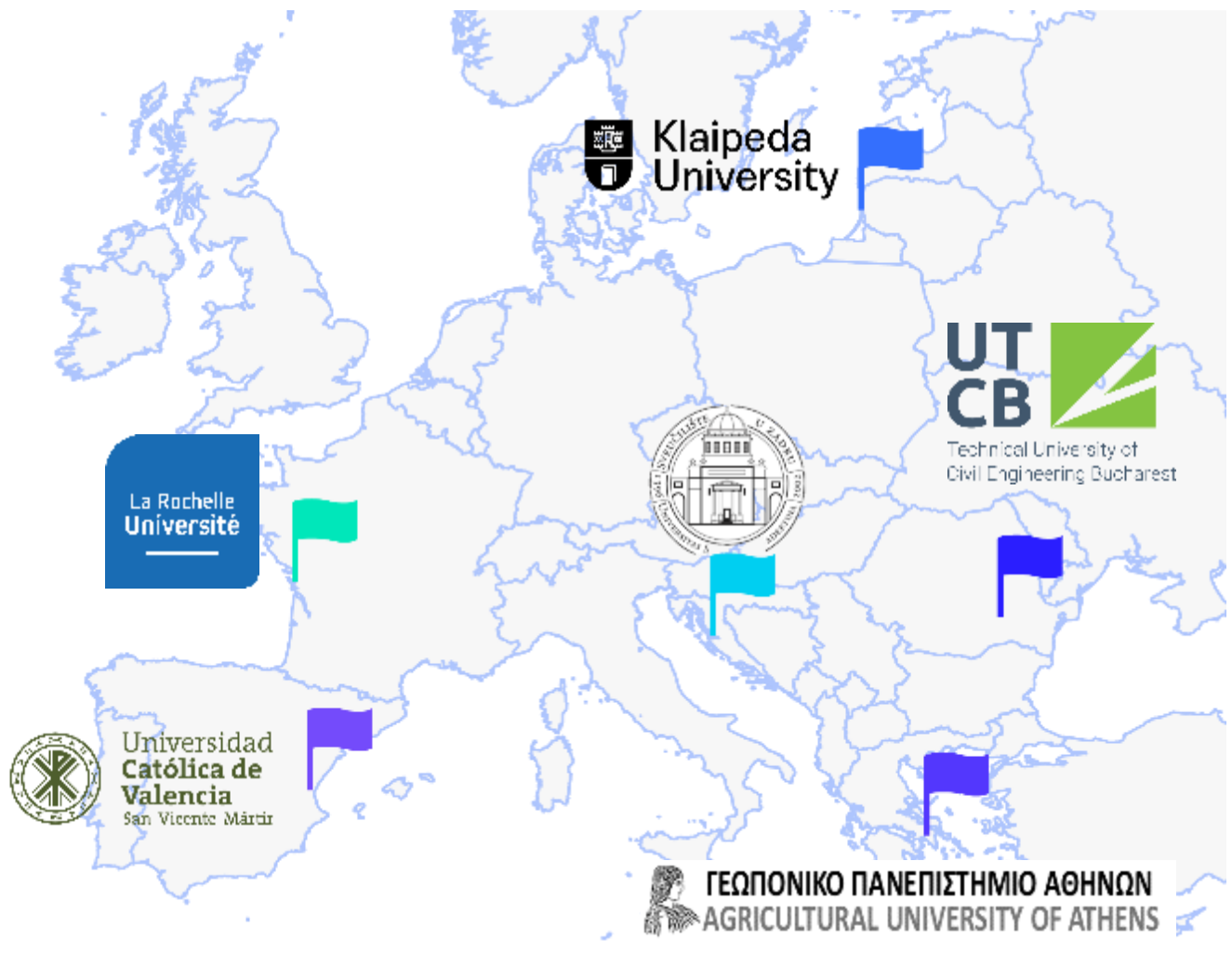
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Erasmus+ Programme
of the European Union

Your university at EU-CONEXUS

The European University for Smart Urban Coastal Sustainability (EU-CONEXUS) is a transnational European higher education and research institution that covers the smart urban sustainable coastal development from a global point of view.

EU-CONEXUS is formed of 6 European universities, which are located in Croatia, Greece, France, Lithuania, Romania and Spain:

- University of Zadar (UNIZD),
- Agricultural University of Athens (AUA),
- La Rochelle Université (LRUniv),
- Klaipeda University (KU),
- Technical University of Civil Engineering Bucharest (UTCB),
- Universidad Católica de Valencia (UCV).



EU-CONEXUS has chosen a focus on urban and semi-urban coastlines because they are increasingly densely populated areas and very important for trade, aquaculture and fisheries, energy, tourism. At the same time, these coastlines are the most vulnerable areas with regard to the consequences of climate change.

Universities and research institutions have a central role to play in promoting the 'Blue Economy' and 'Blue Growth' and to contribute to the skills and competences of the graduates who can work in a complex and challenging labour market. New approach is needed with regard to the organisation of studies and research therefore, 6 universities joined together to merge their strength and know-how in interdisciplinary short-term and degree programmes and to offer the students to study at international inter-campus European University.

Studying at any of above-mentioned university, you can also study at EU-CONEXUS. Choose international courses, joint short-term and degree programmes, benefit from academic and cultural exchange, and receive not only up-to-market knowledge and competences but also enriched curricula, which will be reflected in your European degree and Diploma Supplement.

EU-CONEXUS OPENS UP OPPORTUNITIES TO INTERNATIONAL CURRICULA, CAREER AND EXPERIENCE



What is Minor and how it is compatible with your Bachelor's study programme

EU-CONEXUS Minor programmes are one of these options to construct flexible, international, multidisciplinary curricula and to receive up-to-date competences that are highly required in the labour market. 6 EU-CONEXUS universities created international joint Minor programmes, which you can choose studying Bachelor's at your university.

Minor's programme (sometimes called specialisation) is a specific interdisciplinary set of courses in the same or different field of studies, that you can select freely and make up your own set choosing 30 ECTS throughout your studies (for example, one course during one semester parallel to other courses of your chosen study programme).

- Depending on your study programme, you can choose Minor programme **as a part** or **additionally** to your study curricula.
- EU-CONEXUS Minor programme consists of **five sectors**; each of them offers several courses that you may choose from.

In order to receive Minor's certificate, during your studies you have to be studied **30 ECTS** from:

- minimum **2 different sectors**;
- **3 different** (one could be yours) **EU-CONEXUS universities**,
- **5 courses** in total, maximum 2 courses from your home university.

At the end of your Bachelor's studies you will be awarded with Minor's certificate, and all the courses will be included in your Diploma Supplement.

If you do not wish to attend the full Minor's programme, you can always choose only the courses that interest you and enjoy some of the benefits of the EU-CONEXUS experience and to have them listed in your Diploma Supplement¹.

EU-CONEXUS Minor's programme is also an **academic exchange** experience. Choosing any of EU-CONEXUS courses you will be studying with classmates from 6 different universities in Europe and will gain not only knowledge but also learn about different cultures, languages, markets and gain intercultural experience and improve your English language skills. Each EU-CONEXUS course is considered as academic exchange (similar to Erasmus+) and will be included in the Diploma Supplement to prove your international curriculum.

¹ Minor's certificate will be awarded **only** to the students who follow the general requirements of Minor's.

Minor in Blue Economy and Growth

EU-CONEXUS invites all students of Bachelor's to shape freely their study programmes and to choose the Minor in Blue Economy and Growth.

Seas and oceans are drivers for our economy and have great potential for innovation and growth. Blue economy promotes a sustainable use of ocean resources for economic growth while preserving the health of ocean ecosystems.








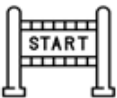


The EU-CONEXUS Minor in Blue Economy and Growth provides you competences and professional skills related to the main industrial and service sectors of the blue economy, which are among the main established and emerging economic maritime sectors:

- Aquaculture and Fisheries
- Marine Biotechnology
- Ocean Energy
- Transport and Shipbuilding
- Coastal and Maritime Tourism

The learning outcomes of this minor will be achieved under practical and professional activities.

Shape your Minor and enrich your knowledge and proficiency in Sustainable Blue Economy!

How to obtain the EU-CONEXUS Minor's certificate

 <p>30 ECTS (6 ECTS per course)</p>	 <p>5 courses per Minor</p>	 <p>min. 3 universities</p>	 <p>min. 2 sectors</p>	 <p>a) part of your study programme or b) extra ECTS</p>
 <p>English B2</p>	 <p>For all BSc students; (groups of 10-30 students)</p>	 <p>Feb 2021</p>	 <p>Mobility: 2020/21: virtual 2022 → blended or virtual</p>	 <p>Diploma Supplement + EU-CONEXUS Minor certificate</p>

How to choose sectors and courses

- **Choose the sectors.** Sectors are the areas into which the Minor's programme is divided. The Minor's programme consists of 5 thematic areas (sectors) into which the Minor of Blue Economy and Growth is focused. You can choose freely the sectors of your interest or the most relevant to your Bachelor's studies. To receive Minor's certificate you must have chosen courses from minimum 2 sectors by the end of your Bachelor's studies.
- **Choose the topic.** Topic is a field of study that could be comprised by 1 (then the title matches with the title of the course) or more courses with similar or compatible contents. Each sector consists of 3 topics, 15 topics in total. Number of topics you choose has no effect to receive Minor's certificate.
- **Choose the courses.** Course refers to a series of lectures, discussions, or other lectures in a particular subject. Course lasts one academic term and is measured in European credits (ECTS). All EU-CONEXUS Minor's courses consist of 6 ECTS and are taught in *English*. You can choose 1-2 courses per semester (consult with the coordinator at your university). Pay attention in which semester, by which university the course is offered and read the prerequisites to be eligible to study the course. The course may be taught only virtually where you will be studying with the classmates from 6 different universities, or to include short term academic exchange at the university which offers this course when you can meet all the teachers and classmates in real life (blended) ([see Appendix 1](#)). To receive Minor's certificate you must have chosen courses from minimum 3 different universities (one of them could be your university) by the end of your Bachelor's studies.
- **Remember:** The Minor's courses can be part of your predefined study programme or extra 'optional' courses.
- You can join the Minor's programme starting from any semester. The first intake is spring semester of 2020/2021. Just note, if you take 1 course per semester, you will need 5 semesters to gather required 30 ECTS of the Minor's programme. [Sign up NOW!](#)

Aquaculture and Fisheries	Sector
1. Sustainable Aquaculture	Topic
1.1. Aquaculture (UCV)	
1.2. Aquaculture (AUA)	Courses
2. Fisheries (UCV)	
3. Built Facilities for Aquaculture (UTCB)	

How to apply

Minor courses can be offered by your home university or any other EU-CONEXUS university. All you need to do is to choose the courses and fill in the application at your home university.

Please check your university's website or contact Minor Officer at your university for more details. One thing we can assure: the procedure is simple, and paperwork is minimal, while Minor Officer will always consult and help you with everything.

Contacts of Minors' officers

University	Name	Surname	E-mail address
UCV	Malgorzata	Musinska	malgorzata.musinska@ucv.es
AUA	Anastasia	Vatousiadi	a.vatousiadi@aua.gr
LRUniv			mineures-eu-conexus@univ-lr.fr
UTCB	Ramona	Diac	ramona.diac@utcb.ro
KU	Ingrida	Rukavice	ingrida.rukavice@ku.lt
UNIZD	Ljerka	Morović	lmorovic@unizd.hr

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Sectors and courses	
Aquaculture and Fisheries	
1. Sustainable Aquaculture	
1.1. Aquaculture (UCV)	
1.2. Aquaculture (AUA)	
2. Fisheries (UCV)	
3. Built Facilities for Aquaculture (UTCB)	
Marine Biotechnology	
4. Blue Biomass Applications	
4.1. Production of Biomass for Blue Applications (LRUniv)	
4.2. Functional and Nutritional Properties of Blue Resources (LRUniv)	
5. Biotechnology of Marine Bioactive Molecules	
5.1. Biotechnology and Nanobiotechnology of Marine Bioactive Molecules (AUA)	
5.2. Marine Biotechnology (UCV)	
6. Microbial Nanobiotechnology	
6.1. Introduction to Microbial Biotechnology (UNIZD)	
6.2. Enzymes and Microbes as Tools for Blue Biotechnology (LRUniv)	
Ocean energy	
8. Energy from Renewable Resources I (wind, waves, tidal, currents) (UTCB)	
9. Energy from Renewable Resources II (solar, hydrothermal, biomass, osmotic, OTEC) (UTCB)	
Transport and Shipbuilding	
10. Sustainable Development of the Maritime Economy (KU)	
11. Basics of Green Shipping (KU)	
12. Sustainable Transport Engineering for Coastal Region	
12.1. Sea Transport Development Basics (KU)	
12.2. Sustainable Transport Engineering for Coastal Region (UTCB)	
Coastal and Maritime Tourism	
13. Sustainable Tourism Development	
13.1. Sustainable Tourism Development (AUA)	
13.2. Sustainable Tourism Development (KU)	
14. Entrepreneurship, Creativity and Innovation Management	
14.1. Entrepreneurship (AUA)	
14.2. Entrepreneurship (UNIZD)	
14.3. Creativity and Innovation Management (UCV)	
15. Introduction to Underwater Archaeology (UNIZD)	



Aquaculture and Fisheries Sector

Aquaculture is the farming of finfish, shellfish and aquatic plants. Aquaculture is one of the world's fastest growing food sectors that already provides the planet with about half of all the fish consumed. In Europe, aquaculture accounts for about 20% of fish production and is known for its high quality, sustainability and consumer protection standards. The sector is mainly composed of SMEs or micro-enterprises in coastal and rural areas. In fisheries, the goal is to foster a dynamic fishing industry and to maximise catches, but also to ensure a fair standard of living for fishing communities. We need to make sure that fishing practices do not harm the ability of fish populations to reproduce, by making fishing fleets more selective and by eliminating the practice of discarding unwanted or undersized fish.

The academic offer of the Aquaculture and Fisheries sector will, therefore, provide you with knowledge in aquaculture methods, systems and species, as well as in the identification, conservation and exploitation of marine resources. The aim is to acquire the necessary expertise to manage aquaculture farms and fish stocks, to ensure the sustainability of

aquaculture and fisheries and finally to recognise the environmental and socio-economic implications of the activities in this sector.

To learn more and gain the competences in Aquaculture and Fisheries we recommend to choose from the following **courses**:

Sector	Topic	Course	Semester	ECTS	University
Aquaculture and Fisheries	1. Sustainable Aquaculture	1.1. Aquaculture	Spring	6	UCV
		1.2. Aquaculture	Autumn	6	AUA
	2. Fisheries	2.1. Fisheries	Spring	6	UCV
	3. Built Facilities for Aquaculture	3.1. Built Facilities for Aquaculture	Spring	6	UTCB

Employability

Aquaculture enterprises, Aquafeed industry, Fishing fleet, Seafood value chain (including processing, exporting, marketing, logistics, sales, etc.), Coastal resources management, Public administration, Environmental and business consultancies, Environmental protection regional development, Fishing tourism.

Topic: Sustainable Aquaculture			
Course: Aquaculture			
University: Universidad Católica de Valencia			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	27 Jan – 20 June
What will you learn:			
<p>Aquaculture is the cultivation of aquatic animals and plants, especially fish, shellfish, and seaweed, in natural or controlled marine or freshwater environments. During this course, the student will learn the zotechnical principles for captive production of aquatic organisms. This course will also describe the fundamentals of aquaculture engineering. The content of the course will help the student to recognise the environmental and socioeconomic implications of aquaculture and will emphasize the aquaculture as a sustainable economic activity. To complete the training, the student will learn to develop breeding plans for aquaculture facilities and to manage small-scale marine crops.</p>			
Course activities:			
<p>Technical visit to land-based fish farm, Technical visit to sea cages fish farm.</p>			
Soft skills:			
Analytical skills, research, written communication.			
Prerequisites:			
Basic concepts in biology (animal classification and main characteristics).			
More information:			
https://www.ucv.es/oferta-academica/grados/grado-en-ciencias-del-mar/seccion/guias-docentes/fichero/ficheroquiadocenteingles/id/273001/plan/2008/mod/2016			

Topic: Sustainable Aquaculture			
Course: Aquaculture			
University: Agricultural University of Athens			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Autumn
		Semester dates:	1 Oct – 14 Jan
What will you learn:			
<p>Aquaculture is the farming of aquatic organisms including fish, mollusks, crustaceans and aquatic plants. The course content covers the following units: Basis of aquaculture, History of aquaculture and its present state, Aquaculture species, Different systems of aquaculture, Production phases of aquaculture, Selection of sites for aquaculture, Water quality for aquaculture, Selection of species for culture, Design and construction of aquafarms, Nutrition and feeds, Live feed, Harvesting and post-harvest technology, Marketing of aquaculture products, Farm management, Sustainability and environmental management of aquaculture. Students will undertake laboratory-based training on zootechnical practices, the function of Recirculating Aquaculture System, monitoring water quality and the maintenance of live feed (phytoplankton, rotifers, <i>Artemia</i>).</p>			
Course activities:			
<p>Technical visit to an off-shore fish farm with floating cages, Technical visit to a fish hatchery.</p>			
Soft skills:			
Analytical skills, research, group/team working, problem solving, presentation.			
Prerequisites:			
Basic concepts in biology (animal classification and main characteristics).			
More information:			
<p>http://www.european.aua.gr/?page_id=780 Department of Animal Science</p>			

Topic: Fisheries			
Course: Fisheries			
University: Universidad Católica de Valencia			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	1 Feb – 20 Jun
What will you learn:			
<p>The student taking this subject will understand conceptually and value the importance of the study of marine living resources in the context of today's science and society.</p> <p>The student will be able to identify the main exploited marine resources, know their biology, locate and understand the location of the main fishing grounds.</p> <p>The student will learn the main techniques of search and extraction of marine living resources and apply the protocols in their evaluation. The student will know diverse experiences of management of marine living resources and will be able to recognise the environmental and socio-economic implications of the fishing activity.</p>			
Course activities:			
Technical visit to a fishing port. Laboratory and informatics practices.			
Soft skills:			
Analytical skills, group/team working, written communication, project management.			
Prerequisites:			
Basic concepts in biology (animal classification and main characteristics).			
More information:			
https://www.ucv.es/oferta-academica/grados/grado-en-ciencias-del-mar/seccion/guias-docentes/fichero/ficheroquiadocenteingles/id/273009/plan/2008/mod/2016			

Topic: Built Facilities for Aquaculture			
Course: Built Facilities for Aquaculture			
University: Technical University of Civil Engineering Bucharest			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	End of Feb - end of Jun
What will you learn:			
<p>The design and construction of built facilities for aquaculture must address multiple challenges: understanding the biological aspects in relation with the local climate and geography, environmental aspects, salinity effects, tidal effects, access to the facilities, resisting weather impact, quality of water for adequate living conditions for aquaculture, the storage of aquaculture products, etc. Therefore, the course addresses at a general level elementary engineering and services aspects, keeping water freshness and aeration, measures to control water pollution, ensuring adequate conditions of air humidity, temperature and velocity during preservation by chilling, packaging of frozen products, increasing aquaculture products storage life.</p>			
Course activities:			
Experts' lecture.			
Soft skills:			
Analytical skills, group/team working, international communication, intercultural skills, innovation/creativity.			
Prerequisites:			
Computer literacy, basic use of Microsoft Office package. The course will introduce all the necessary technical notions.			
More information:			
https://utcb.ro/en/eu-conexus/minor-programmes/blue-economy-and-growth/built-facilities-for-aquaculture/			



Marine Biotechnology Sector

Marine biotechnology is key to reveal the potential of marine bio-resources. This potential remains largely untapped and should be discovered. Marine resources could produce new products and processes, and help address the global challenges of food, energy, health and sustainability.

From GLOBE NEWSWIRE published on 4 March 2019 – ‘The **global marine biotechnology market** is expected to grow significantly **from USD 3,500.4 million** in 2017 to **USD 6,500.6 million** in 2024(..). The growth in the market is attributed to the rising usage of marine biotechnology in various industries, advances in drug discovery and growing expenditure in R&D activities. Moreover, increasing demand for eco-friendly products is further propelling the market growth’.

The marine biotechnology sector is composed of 'big pharma', start-up, SMEs or micro-enterprises everywhere in the world. From operators to PhD graduates, this growing sector need skilled people aware of technics useful to produce biomasses, extract, purify, and characterised biomolecules. Innovation is also one keyword of this still emerging sector.

The academic offer of the Marine Biotechnology sector will, therefore, provide you with knowledge in marine technology in general, to discover this area. Then, courses that are more specific will give you tools to produce biomasses, use marine living organisms and understand functionalities.

To learn more and gain the competences in Marine Biotechnology we recommend to choose from the following **courses**:

Sector	Topic	Course	Semester	ECTS	University
Marine Biotechnology	4. Blue Biomass Applications	4.1. Production of Biomass for Blue Applications	Spring	6	LRUniv
		4.2. Functional and Nutritional Properties of Blue Resources	Spring	6	LRUniv
	5. Biotechnology of Marine Bioactive Molecules	5.1. Biotechnology of Marine Bioactive Molecules	Spring	6	AUA
		5.2. Marine Biotechnology	Autumn	6	UCV
	6. Microbial Nanobiotechnology	6.1. Introduction to Microbial Biotechnology	Spring	6	UNIZD
		6.2. Enzymes and Microbes as Tools for Blue Biotechnology	Spring	6	LRUniv

Employability

Agri-food industry using marine resources (algae's, fishes by-products), biotechnology companies, biomasses processing companies, pharmaceutical companies using marine bio-sourced molecules.

Topic: Blue Biomasses Application			
Course: Production of Biomasses for Blue Applications			
University: La Rochelle Université			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	Feb- Jun (pending dates)
What will you learn:			
<p>Oceans are great sources of various molecules with plenty of applications. To be able to propose enough actives on the market, resources from the sea must be produced in adequate conditions. 'Production of biomasses for blue application' will describe blue biomasses available; introduce production and biomasses conversion strategies to obtain valuable actives. The subject will enable the student to learn which the main blue biomasses from marine sources are. They will also learn which challenges they will have to face in this domain.</p> <p>Students will follow online courses with teachers and experts and undertake group works to acquire and improve their knowledge.</p>			
Course activities:			
The student will learn to develop the whole scientific process from bibliographical survey to scientific writing allowing them to go from the idea to generate interesting compound to the market.			
Soft skills:			
Analytical skills, group/team working, research (scientific writing and oral presentation), ICT skills.			
Prerequisites:			
Background in 1) basic biochemistry (hydrocarbons, proteins, lipids), 2) basic analytical and processing methods.			
More information:			
https://formations.univ-larochelle.fr/licence-sciences-sante			

Topic: Blue Biomasses Application			
Course: Functional and Nutritional Properties of Blue Resources			
University: La Rochelle Université			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Spring
		Semester dates:	Feb – Jun (pending dates)
What will you learn:			
<p>Blue resources are extracted from Oceans. They are unique and possess plenty of applications. To understand what actives are already on the market and which are opportunities, students will learn how what are functional properties and how to demonstrate them. They will also learn the contribution of blue molecules to health through nutritional properties. "Functional and nutritional properties of blue resources" will first describe how ingredients behave during preparation and cooking, how they affect the finished food product in terms of how it looks, tastes, and feels. Functional properties include dextrinisation, caramelisation, flavour preserving, jelling, denaturation, coagulation, gluten formation, shortening, plasticity, aeration, flakiness, retention of moisture, sensory attributes. Then, the marine originating ingredient will be discussed and nutritional properties described.</p> <p>Students will undertake group works to acquire and improve their knowledge.</p>			
Course activities:			
The student will learn to develop the whole scientific process from bibliographical survey to scientific writing allowing them to go from the idea of a blue bioactive compound to the market.			
Soft skills:			
Analytical skills, group/team working, research (scientific writing and oral presentation), ICT skills.			
Prerequisites:			
Background in biochemistry, structure-function relationship.			
More information:			
https://formations.univ-larochelle.fr/licence-sciences-sante			

Topic: Biotechnology of Marine Bioactive Molecules			
Course: Biotechnology of Marine Bioactive Molecules			
University: Agricultural University of Athens			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	14 Feb – 3 Jun
What will you learn:			
<p>Biotechnology involves the application of science and technology to produce knowledge, goods and services for the improvement of human health. Therefore, the course of Biotechnology and Nanobiotechnology of Marine Bioactive molecules will describe the characteristics of marine molecules or extracts, introduce bioprospecting strategies (mass production, marketing-oriented tools), screening techniques of bioactivity (<i>in vitro</i>-methods, <i>in vivo</i>-methods, biomass extraction, metabolomics), methods for immobilizing/entrapping biomolecules and molecular interaction and modelling. The subject will enable the student to learn the main biotechnological applications of marine bioactive molecules in human health and nutrition or personal care products (cosmeceuticals, cosmetics). Students will undertake laboratory-based training and practical experience in state-of-the-art laboratory techniques (omic technologies, cell-culture, PCRs, synthesis and extraction of RNA, electrophoresis, etc.).</p>			
Course activities:			
The student will learn to develop the whole scientific process (from sampling to scientific writing).			
Soft skills:			
Analytical skills, group/team working, ICT skills, autonomous work, work in a multidisciplinary environment, innovation/creativity (promotion of free, creative and inductive thought).			
Prerequisites:			
Basic background in: 1) biochemistry (hydrocarbons, proteins, lipids), other biomolecules RNA, DNA. 2) cell biology (photosynthesis, metabolism, etc.). 3) taxonomy. 4) bioinformatics.			
More information:			
The link is not available yet.			

Topic: Biotechnology of Marine Bioactive Molecules			
Course: Marine Biotechnology			
University: Universidad Católica de Valencia			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Autumn
		Semester dates:	1 Sep – 23 Jan
What will you learn:			
<p>Marine biotechnology involves the application of science and technology to produce knowledge, goods, and services from marine biological resources. Therefore, the course of Marine Biotechnology will describe the characteristics of secondary metabolites; introduce bioprospecting strategies and screening techniques of marine organisms and a wide range of biotechnologies (treatment technology, bioremediation, on-site and 'ex-situ' technologies). The subject will enable the student to learn the main biotechnological applications in marine animals, human health, aquaculture, and food safety. Students will undertake laboratory-based training and practical experience in some of these techniques (PCRs, synthesis and extraction of RNA, electrophoresis, etc.).</p>			
Courseactivities:			
The student will learn to develop the whole scientific process (from sampling to scientific writing).			
Soft skills:			
Analytical skills, group/team working, research (scientific writing and oral presentation), ICT skills.			
Prerequisites:			
Basic background in 1) biochemistry (hydrocarbons, proteins, lipids), other biomolecules RNA, DNA. 2) Marine Biology (photosynthesis, metabolism, etc.). 3) Fisiology			
More information:			
https://www.ucv.es/oferta-academica/grados/grado-en-ciencias-del-mar/seccion/guias-docentes/fichero/ficheroGuiadocenteingles/id/270227/plan/2008/mod/2016			

Topic: Microbial Nanobiotechnology			
Course: Introduction to Microbial Biotechnology			
University: University of Zadar			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	1 Mar – 9 Jul
What will you learn:			
Introduction to microbial biotechnology presents the scientific knowledge for the use of microorganisms and their metabolites in various activities such as the production of goods in food, feed and pharmaceutical industry, agronomy and medicine. To achieve this the course will describe the characteristics of secondary metabolites, introduce bioprospecting strategies and enzymology as well as screening techniques applied in microbial biotechnology. During the course, the student will be acknowledged with the main biotechnological applications of bacteria, yeasts and fungi and their metabolites in human and animal health and wellbeing, agriculture and food processing and safety. Students will undertake laboratory-based training in some of these techniques.			
Course activities:			
Guest lectures in probiotics, group project preparation, visit to a biotech company.			
Soft skills:			
Group/team working, problem solving, research, presentation, international communication.			
Prerequisites:			
Basic background in: 1) biochemistry (hydrocarbons, proteins, lipids, enzymes), 2) biology of the prokaryotic and eukaryotic cell (structure, metabolism, etc.).			
More information:			
The link is not available yet.			

Topic: Microbial Nanobiotechnology			
Course: Enzymes and Microbes as Tools for Blue Biotechnology			
University: La Rochelle Université			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Spring
		Semester dates:	Feb – Jun (pending dates)
What will you learn:			
<p>Conversion of blue originating biomasses into valuable molecules needs specific tools. Enzymes and microbes carefully chosen can be included in conversion processes. With 'Enzymes and microbe as tools for blue Biotechnology', students will learn more about enzymology applied to blue biotechnology: marine examples of oxidoreductases, hydrolases, transferases, isomerases, ligases, and lyases ready for food and pharmaceutical applications. Then, the use of microorganisms in conversion processes for the production of goods in various domains will be discussed.</p> <p>Methods to select adequate enzyme and microorganisms to reach conversion goals will be presented.</p>			
Course activities:			
Group project work.			
Soft skills:			
Group/team working, problem solving, research, presentation, international communication.			
Prerequisites:			
Basic background in: 1) biochemistry 2) enzymology 3) microbiology.			
More information:			
https://formations.univ-larochelle.fr/licence-sciences-sante			



Ocean Energy Sector

Ocean energy is abundant, geographically diverse and renewable. Under favourable regulatory and economic conditions, ocean energy could meet 10% of the European Union's power demand by 2050, based on clean, renewable and infinite domestic resources. Together with the first generation of renewable energy technologies, such as solar and wind, EU will reach its objective of reducing greenhouse gas emissions to 80–95 % below 1990 levels by 2050 when power generated by the ocean energy sector could avoid the equivalent of 276m tonnes of CO₂ emissions annually.²

Within the Minor of Blue Economy and Growth, the 'Ocean Energy' sector welcomes students eager to learn more about Blue and renewable energy, and marine mineral resources, with courses that will deepen the knowledge and practical use of classical or unconventional sources of mechanical and thermal energy in the oceans and from the coastal area. Students will study the fundamentals and practical applications of the capture,

² Ocean Energy Strategic Roadmap Building Ocean Energy For Europe-
<https://webgate.ec.europa.eu/maritimeforum/en/frontpage/1036>

conversion, and shore transmission of energy from wind, waves, tides and sea currents, as well as solar energy, chemical energy of biomass and thermal energy of the oceans.

To learn more and gain the competences in Ocean Energy we recommend to choose from the following **courses**:

	Topic	Course	Semester	ECTS	University
Sector	8. Energy from Renewable Resources I (wind, waves, tidal, currents)	8.1. Energy from Renewable Resources I (wind, waves, tidal, currents)	Spring	6	UTCB
	9. Energy from Renewable Resources II (solar, hydrothermal, biomass, osmotic, OTEC)	9.1. Energy from Renewable Resources II (solar, hydrothermal, biomass, osmotic, OTEC)	Spring	6	UTCB

Employability

Renewable energies sector, aquaculture engineering, offshore industries, environment protection.

Course: Energy from Renewable Sources I			
Topic: Energy from Renewable Sources I			
University: Technical University of Civil Engineering Bucharest			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Spring
		Semester dates:	22 Feb – 28 May
What will you learn:			
Starting from the definition of renewable energy, the course will focus on mechanical energy sources (wind and water). The time variability of the resources will be discussed in conjunction to human consumption habits. Energy transportation networks will be discussed along with the conversion of the mechanical energy of the ocean into electrical energy and transporting it to shore. Elements related to electric generators, transformation systems, protection and safety systems and intelligent control of ocean power plants would be studied. Students will become familiar with the differences between efficiency and capacity factors as well as between installed power and energy production.			
Course activities:			
Some of the lectures will include virtual laboratory demonstrations.			
Soft skills:			
Analytical skills, problem solving, Innovation/creativity, presentation, ICT skills.			
Prerequisites:			
Computer literacy, basic use of Microsoft Office package. The course will introduce all the necessary technical notions.			
More information:			
https://utcb.ro/en/eu-conexus/minor-programmes/blue-economy-and-growth/energy-from-renewable-resources-i-wind-waves-tidal-currents/			

Topic: Energy from Renewable Resources II			
Course: Energy from Renewable Resources II			
University: Technical University of Civil Engineering Bucharest			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Spring
		Semester dates:	22 Feb – 28 May
What will you learn:			
<p>This course is addressed to students eager to know more about renewable sources of thermal energy in the seas and oceans as well as in the coastal area. We will study the potential of ocean energy sources and processes of thermal energy conversion with widely used installations and equipment such as solar thermal panels and photovoltaic panels, cycles of solar electric conversion, hydrothermal (marine) heat pumps, and the energy use of ocean or coastal biomass. Among the installations still in development, the cycles of OTEC (Ocean Thermal Energy Conversion) and osmotic (based on the difference in salinity) plants will be studied.</p>			
Course activities:			
Soft skills:			
Analytical skills, group/team working, problem solving, presentation, international communication.			
Prerequisites:			
Computer literacy, basic use of Microsoft Office package. The course will introduce all the necessary technical notions.			
More information:			
https://utcb.ro/en/eu-conexus/minor-programmes/blue-economy-and-growth/energy-from-renewable-resources-ii-solar-hydrothermal-biomass-osmotic-otec/			



Transport and Shipbuilding Sector

Rapidly growing trade and the need for effective means of transport and its systems accompany globalisation. Shipping has been playing a crucial role here therefore the impact of shipping and seaport sector on the regional socio-economic activity is undeniable. To compete successfully, the need to understand how the global transport business ecosystem works, how to find the new innovative ways of transporting cargoes and passengers, how to develop more efficient mechanisms to deal with climate change.

Shipping is still responsible for approximately 2.5% of global greenhouse gas (GHG) emissions and represents approximately 13% of the overall EU GHG emissions from the transport sector in 2015. Further decrease in shipping emissions is obligatory in green-minded Europe, which call for greening of shipping and ports.

There are known many solutions how to reduce the impact from ships in operation but still not enough to meet IMO requirements in 2050. A new context presents designers and engineers with new opportunities. Similarly, maritime law, finance, broking and insurance can all benefit from the growing volume of sea trade.

To learn more and gain the competences in Transport and Shipbuilding we recommend to choose from the following **courses**:

Sector	Topic	Course	Semester	ECTS	University
Transport and Shipbuilding	10. Sustainable Development of the Maritime Economy	10.1. Sustainable Development of the Maritime Economy	Autumn	6	KU
	11. Basics of Green Shipping	11.1. Basics of Green Shipping	Autumn	6	KU
	12. Sustainable Transport Engineering for Coastal Region	12.1. Sea Transport Development Basics	Autumn	6	KU
		12.2. Sustainable Transport Engineering for Coastal Region	Spring	6	UTCB

Employability

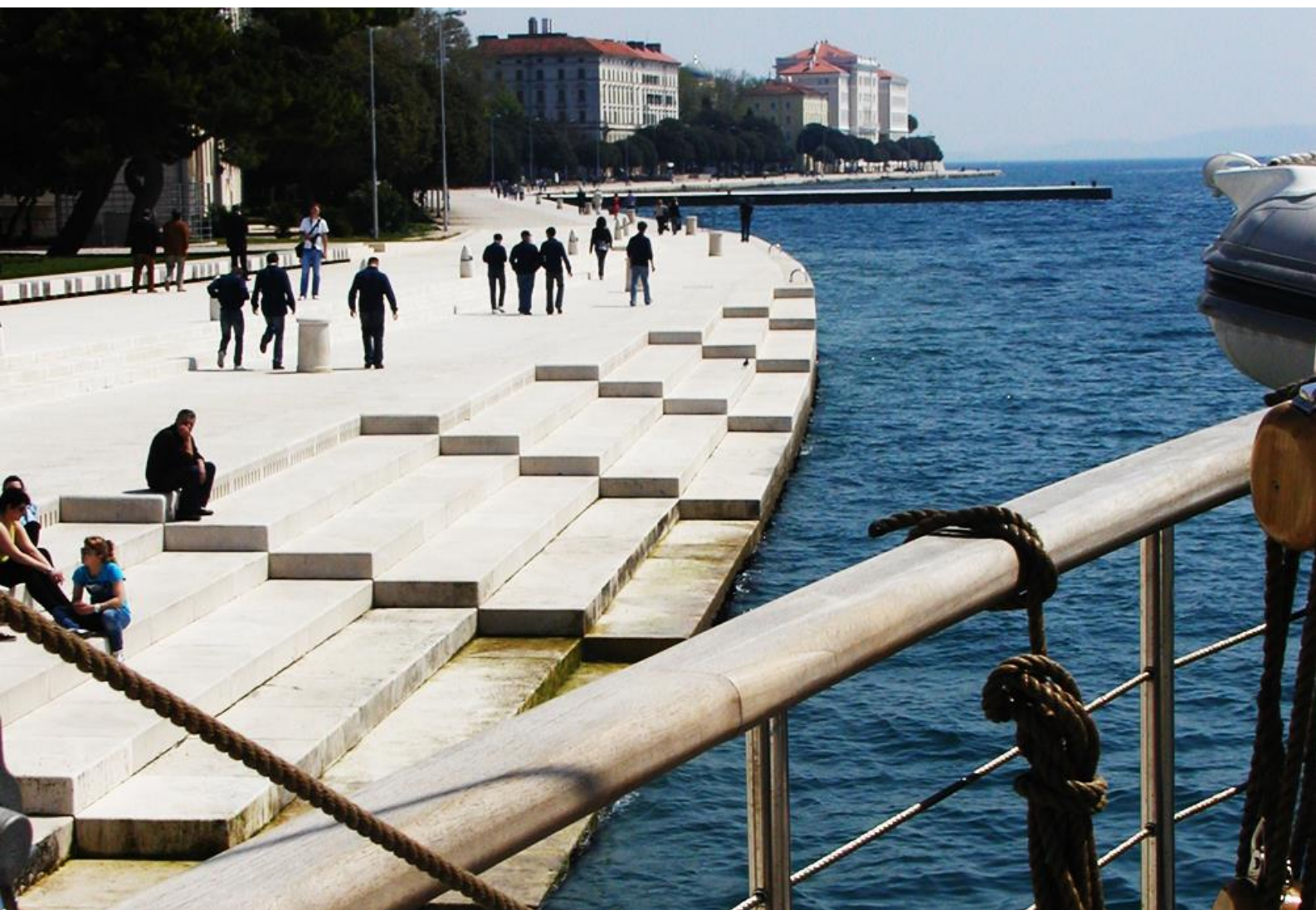
Seaport authorities, Agencies, Associations, Forwarding, Container, Ro-ro terminals, Stevedoring, Cruise ship terminals, Travel agencies serving cruise vessel tourists, Ship suppliers, Ship repair, building, technical services, Shipping companies, Customs agents, etc.

Topic: Sustainable Development of Maritime Economy			
Course: Sustainable Development of Maritime Economy			
University: Klaipeda University			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Autumn
		Semester dates:	1 Sep – 23 Jan
What will you learn:			
<p>The course is designed to study theoretical and practical aspects of maritime economy from a sustainable development point of view, to introduce to different cases and practices of sustainable maritime economy growth solutions. The course is based on knowledge of the maritime complex structure and the emerging environmental issues such as the impact of maritime transport on the environment of global and local scale, the impact of economic development of maritime industry on the interconnection of the ecosystem in ports structures, sustainable environmental and technological solutions in the maritime industry. The importance and main principles of sustainable development in the Maritime Economy will be analysed in depth. Particular attention will be given to main innovative solutions for ensuring Sustainable development of Maritime Economy.</p>			
Course activities:			
Case study, international group project, interactive seminars, site/field visit, analysis of maritime development projects, analysis of strategical management plans.			
Soft skills:			
Analytical skills of problems solving, analysis of case studies, group/team working, presentation, international communication.			
Prerequisites:			
Basics of Economics, Strategic Management/Industrial management, Basics of Sustainable growth.			
More information:			
The link is not available yet.			

Topic: Basics of Green Shipping			
Course: Basics of Green shipping			
University: Klaipeda University			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Autumn
		Semester dates:	1 Sep – 23 Jan
What will you learn:			
<p>Green shipping refers to the reduced use of resources and energy to transport people and goods by ship and is specifically concerned with the protection of the global environment from greenhouse gases and environmental pollutants generated by ships. The course is designed to study scalable solutions for efficient and environmentally friendly shipping, to be acquainted with the concepts and key indicators of green shipping and green port, to be able to select the optimal green shipping solutions for ships, ports, waterways, access to port terminals based on the economic, environmental and social efficiency.</p>			
Course activities:			
Case study, interactive seminars.			
Soft skills:			
Analytical skills of problems solving, analysis of case studies, presentation, international communication.			
Prerequisites:			
Would help if the student has knowledge in the field of Geography of Ports and Waterways, Basics of Sustainable growth.			
More information:			
The link is not available yet.			

Topic: Sustainable Transport Engineering for Coastal Region			
Course: Maritime Transport Development Basics			
University: Klaipeda University			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Autumn
		Semester dates:	1 Sep – 23 Jan
What will you learn:			
<p>Maritime transport is the backbone of world trade and globalisation. Maritime transport as a vital link in an international logistics chain exists in conjunction with the many shore-side infrastructures, services and personnel for cargo handling and delivery. Considering it, the course is designed to study theoretical and practical aspects of maritime transportation system development based on an assessment of the current situation, future prospects and analysis of arising problems. Particular attention will be given to the latest transportation methods under different conditions including an organisation of transportation of oversized cargo; ports and waterways planning including dredging; exploiting the existing motorways of the sea and the development of the new motorways of the sea; the environmental impact and risk assessment in maritime transport.</p>			
Course activities:			
Group work, one-to-one tutorials, analysis of motorways of the sea and port development projects, site/field visits, experts' lectures.			
Soft skills:			
Analytical skills of problems solving, development of critical thinking through case studies, group/team working, presentation, international communication.			
Prerequisites:			
Would help if the student has knowledge in the field of Geography of Ports and Waterways, Basics of Port Organisation and Logistics.			
More information:			
The link is not available yet.			

Topic: Sustainable Transport Engineering for Coastal Region			
Course: Sustainable Transport Engineering for Coastal Region			
University: Technical University of Civil Engineering Bucharest			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	22 Feb – 28 May
What will you learn:			
<p>This course introduces the fundamentals of transport engineering focusing on the peculiarities of the coastal regions (high density of population and built environment, high traffic due to coastal economy and tourism, various natural hazards, protection of historic heritage, etc.). The transport network includes roads, railways, and bridges ensuring not only the regular activities in the area but also ensuring the functionality of the port. Within the course, students will discover the fundamentals of conception, design, and construction of transport network, as well as the principles and solutions of smart management. Sustainability, environmental protection, and development challenges are also addressed from a European perspective.</p>			
Course activities:			
Group project.			
Soft skills:			
Analytical skills, problem solving, presentation, innovation/creativity, project management.			
Prerequisites:			
Computer literacy, basic use of Microsoft Office package. The course will introduce all the necessary technical notions.			
More information:			
https://utcb.ro/en/eu-conexus/minor-programmes/blue-economy-and-growth/sustainable-transport-engineering-for-coastal-region/			



Coastal and Maritime Tourism Sector

Today's tourists seek a unique and customised holiday experience, not only traditionally offered packages of beautiful coast, beach, and sun. These changes on the demand side require reaction and adaptation by operators and destinations, i.e. enhancing the levels of creativity and adaptability in tourism businesses. The sector should, besides traditional offer, develop new products promoting attractiveness and accessibility of coastal and marine archaeology, maritime heritage, underwater tourism, and eno-gastronomic activities, among other activities. During that, process focus of all stakeholders in tourism should be on sustainable tourism.

The academic offer of the Coastal and Maritime Tourism sector will, therefore, provide you knowledge in entrepreneurship in tourism, in creation of new tourism product which is more aligned with new tourist's needs, in creating of products that balance tourist needs and sustainability.

To learn more and gain the competences in Coastal and Maritime Tourism we recommend to choose from the following **courses**:

Sector	Topic	Course	Semester	ECTS	University
Coastal and Maritime Tourism	13. Sustainable Tourism Development	13.1. Sustainable Tourism Development	Autumn	6	AUA
		13.2. Sustainable Tourism Development	Spring	6	KU
	14. Entrepreneurship, Creativity and Innovation Management	14.1. Entrepreneurship	Spring	6	AUA
		14.2. Entrepreneurship	Autumn	6	UNIZD
		14.3. Creativity and Innovation Management	Spring	6	UCV
	15. Introduction to Underwater Archaeology	15.1. Introduction to Underwater Archaeology	Autumn	6	UNIZD

Employability

Expertise in Coastal and Maritime Tourism is required in economic sectors that are related to tourism: public and private sector, hotel industry, gastro industry, entertainment industry, local community organisations, regional development, etc.

Topic: Sustainable Tourism Development			
Course: Sustainable Tourism Development			
University: Agricultural University of Athens			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Autumn
		Semester dates:	1 Oct – 14 Jan
What will you learn:			
<p>This course will 'navigate' students through the concepts of environmental impact, sustainability and the challenges proposed in the New Economics paradigm, from which tourism can borrow examples of development. The module aims at explaining the nature of externalities generated by tourism, the difference between the generation of income and wellbeing, analysing environmental impacts caused by tourism, understanding the difference between renewable and non-renewable resources and the treatment of the environment as a sink. The module will provide the basic tools for economic valuation that could be employed for all-inclusive pricing of tourism products, which will also enable full compensation for the environmental impact caused by tourism, particularly for socially fair pricing of open-access resources. Besides major policy events and summits from which new deadlines for correcting environmental damaging behaviours, there are various tools available, through which unsustainable cases can be remedied or even circumvented (e.g. taxes, permits, ownership, subsidies, laws and controls, corporate social responsibility, special designation, tradable rights, tourism eco-labelling, certification and award schemes, ecotourism approaches, etc.).</p>			
Course activities:			
Presentation of case studies and movies. The student will have the opportunity to reflect on major case studies and observe what he/she learns through movies and YouTube material.			
Soft skills:			
Group/team working, research (scientific writing and oral presentation), ICT skills.			
Prerequisites:			
None.			
More information:			
The link is not available yet.			

Topic: Sustainable Tourism Development			
Course: Sustainable Tourism Development			
University: Klaipeda University			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester:	Spring
		Semester dates:	1 Feb – 21 Jun
What will you learn:			
<p>The course is intended to introduce students with the concepts of sustainable tourism development, its patterns, principles and their practical application in tourism management. During the course, students will gain an understanding of the strengths and challenges of tourism as a tool for sustainable development, key actors in sustainable tourism, their impact and interaction within each other. The course helps to form a systematic knowledge about the impacts of the tourism industry on destinations and local communities, to understand how sustainable tourism works within a different type of tourism sectors and types of tourism.</p>			
Course activities:			
<p>Students will improve their analytical and creative skills working on group tasks, which are aimed to help to understand the topic better and to trigger professional curiosity.</p>			
Soft skills:			
<p>Analytical skills, group/team working, problem solving, presentation, innovation/creativity.</p>			
Prerequisites:			
<p>None.</p>			
More information:			
<p>The link is not available yet.</p>			

Topic: Entrepreneurship, Creativity and Innovation Management			
Course: Entrepreneurship			
University: Agricultural University of Athens			
6 ECTS		Language:	English
Teaching mode:	Blended or Virtual (tbc)	Semester: Semester dates:	Spring 14 Feb – 3 Jun
What will you learn:			
<p>Sustainable tourism development presupposes the economic sustainability of the businesses, which very much relies on the knowledge of fundamental entrepreneurship skills and the management of creativity of innovation. These can guarantee the perennial flourishing of a tourism business. The course will start with the concept of entrepreneurship, the steps for successful entrepreneurship, the nature of startups, what constitutes corporate entrepreneurship, the acknowledgement of entrepreneurial opportunities in coastal and marine tourism. The course will also explain the different definitions of innovation, its implementation and how innovation is incorporated in the tourism business. By the end of the course, the student will be able to recognise creative and innovative opportunities and will be able to turn them to the benefit of a tourism business.</p>			
Course activities			
<p>Presentation of case studies and movies, interviews with successful entrepreneurs, success stories. The student will have the opportunity to reflect on major case studies and observe what he/she learns through movies and YouTube material. Foremost the student will have the opportunity to observe success stories of various entrepreneurs.</p>			
Soft skills:			
Group/team working, research (scientific writing and oral presentation), ICT skills.			
Prerequisites:			
None			
More information:			
The link is not available yet.			

Topic: Entrepreneurship, Creativity and Innovation Management			
Course: Entrepreneurship			
University: University of Zadar			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Autumn
		Semester dates:	1 Oct – 19 Feb
What will you learn:			
The course content covers the following units: entrepreneurship and entrepreneurs in general, the significance and role of entrepreneurship in social and economic development, enterprise models and their characteristics, the development of and perspectives for enterprise in the EU, stimulating enterprise, and innovative entrepreneurship. During the course, students will learn to make a simple business plan.			
Course activities:			
The student will learn to create a simple business plan for an innovative business idea.			
Soft skills:			
Analytical skills, group/team working, problem solving, research, presentation, Innovation/creativity, project management.			
Prerequisites:			
Background in finance (investment, revenues and expenses).			
More information:			
https://www.unizd.hr/Portals/0/ms/syllabi/20_21_ECON_W_Entrepreneurship.pdf?ver=2020-03-09-152454-363			

Topic: Entrepreneurship, Creativity and Innovation Management			
Course: Creativity and Innovation Management			
University: Universidad Católica de Valencia			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Spring
		Semester dates:	27 Jan – 20 Jun
What will you learn:			
<p>The course will lead the students to acquire basic concepts and tools to implement and operate innovation management in an organisation, as well as the skills and values needed to carry out a collaborative creative work aimed at achieving objectives of improvement and innovation. Students will learn the basic concepts of managing innovation and creativity, the innovation strategy and value creation, how to build the innovative organization and finally to follow the whole innovation process: from the idea to the market.</p>			
Course activities:			
Innovative learning experience (case method teaching), experts' lectures, work with entrepreneurs.			
Soft skills:			
Group/team working, innovation/creativity, international communication, project management.			
Prerequisites:			
None.			
More information:			
https://www.ucv.es/oferta-academica/grados/grado-en-administracion-y-direccion-de-empresas/seccion/guias-docentes/fichero/ficheroquiadocenteingles/id/302016/plan/2008/mod/2016			

Topic: Introduction to Underwater Archaeology			
Course: Introduction to Underwater Archaeology			
University: University of Zadar			
6 ECTS		Language:	English
Teaching mode:	Virtual	Semester:	Autumn
		Semester dates:	1 Oct – 19 Feb
What will you learn:			
<p>The course introduces the students to the specific area of research within the scientific field of archaeology. Although sharing the same methodology with land archaeology, the underwater archaeology requires specific technological equipment and diving skills. The course presents the history of the underwater archaeology in the world, a variety of underwater archaeological sites, basic methodology and technics of underwater research, and development of underwater archaeology in Croatia. It focuses on the specific underwater archaeological sites to explain the diversity of underwater cultural heritage, and different approaches needed for their exploration.</p>			
Course activities:			
<p>The students will have the opportunity to visit the archaeological site in shallow water and experience the work in the field.</p>			
Soft skills:			
<p>Analytical skills, group/team working, research, presentation, project management.</p>			
Prerequisites:			
<p>None.</p>			
More information:			
<p>https://www.unizd.hr/Portals/0/ms/syllabi/20_21_ARCHAE_W_Introduction%20to%20underwater%20archaeology.pdf?ver=2020-03-06-154928-167</p>			

Appendix. Proposed courses in 2021-22 academic year

In the Table below presents all the courses that will be offered in a virtual or blended teaching mode from the academic year 2021-22.

Sector	Topic	Course	Semester	ECTS	University	My study plan
Aquaculture and Fisheries	1. Sustainable Aquaculture	1.1. Aquaculture	Spring	6	UCV	<input type="checkbox"/>
		1.2. Aquaculture	Autumn	6	AUA	<input type="checkbox"/>
	2. Fisheries	2.1. Fisheries	Spring	6	UCV	<input type="checkbox"/>
Marine Biotechnology	4. Blue Biomass Applications	4.1. Production of Biomass for Blue Applications	Spring	6	LRUniv	<input type="checkbox"/>
		4.2. Functional and Nutritional Properties of Blue Resources	Spring	6	LRUniv	<input type="checkbox"/>
	5. Biotechnology of Marine Bioactive Molecules	5.1. Biotechnology of Marine Bioactive Molecules	Spring	6	AUA	<input type="checkbox"/>
		5.2. Marine Biotechnology	Autumn	6	UCV	<input type="checkbox"/>
	6. Microbial Nanobiotechnology	6.1. Introduction to Microbial Biotechnology	Spring	6	UNIZD	<input type="checkbox"/>
		6.2. Enzymes and Microbes as Tools for Blue Biotechnology	Spring	6	LRUniv	<input type="checkbox"/>
Ocean energy	8. Energy from Renewable Resources I (wind, waves, tidal, currents)	8.1. Energy from Renewable Resources I (wind, waves, tidal, currents)	Spring	6	UTCB	<input type="checkbox"/>
	9. Energy from Renewable Resources II (solar, hydrothermal, biomass, osmotic, OTEC)	9.1. Energy from Renewable Resources II (solar, hydrothermal, biomass, osmotic, OTEC)	Spring	6	UTCB	<input type="checkbox"/>
Transport and Shipbuilding	10. Sustainable Development of the Maritime Economy	10.1. Sustainable Development of the Maritime Economy	Autumn	6	KU	<input type="checkbox"/>
	11. Basics of Green Shipping	11.1. Basics of Green Shipping	Autumn	6	KU	<input type="checkbox"/>
	12. Sustainable Transport	12.1. Sea Transport Development Basics	Autumn	6	KU	<input type="checkbox"/>

	Engineering for Coastal Region	12.2. Sustainable Transport Engineering for Coastal Region	Spring	6	UTCB	<input type="checkbox"/>
Coastal and Maritime Tourism	13. Sustainable Tourism Development	13.1. Sustainable Tourism Development	Autumn	6	AUA	<input type="checkbox"/>
		13.2. Sustainable Tourism Development	Spring	6	KU	<input type="checkbox"/>
	14. Entrepreneurship, Creativity and Innovation Management	14.1. Entrepreneurship	Spring	6	AUA	<input type="checkbox"/>
		14.2. Entrepreneurship	Autumn	6	UNIZD	<input type="checkbox"/>
		14.3. Creativity and Innovation Management	Spring	6	UCV	<input type="checkbox"/>
15. Introduction to Underwater Archaeology	15.1. Introduction to Underwater Archaeology	Autumn	6	UNIZD	<input type="checkbox"/>	

Reminder: for fulfilling a Minor, students must select 5 courses from at least 2 different sectors (within the same minor) offered by 3 universities (one may be his own university)