

Annexes 5 & 6.

Course syllabi and Structure of the curriculum



Course Syllabi & Structure of the Joint Programme

The philosophy of the Joint Bachelor's Degree in Sustainable Blue Economy is centred on providing a comprehensive, interdisciplinary, and practical education that prepares students to address the multifaceted challenges of the blue economy. Through a focus on sustainability, innovation, global perspective, and ethical responsibility, the programme aims to cultivate knowledgeable and skilled professionals capable of leading and advancing sustainable practices within the blue economy sector.

Y1. Core Module (60 ECTS). *Learning the Ropes*

Code	Course name	ECTS
SBE101	Marine Ecosystems & Biodiversity	5 (Compulsory)
SBE102	Ocean Functioning	5 (Compulsory)
SBE103	Applied Mathematics	5 (Compulsory)
SBE104	Foundations of Economics	5 (Compulsory)
SBE105	Introduction to Sustainable Blue Development	5 (Compulsory)
SBE106	Soft & Academic Skills	5 (Compulsory)
SBE107	Marine Natural Capital & Ecosystem Services	5 (Compulsory)
SBE108	Impact of Human Activities on the Ocean	5 (Compulsory)
SBE109	Blue Business Management	5 (Compulsory)
SBE110	Marine & Maritime Governance, Laws & Regulations	5 (Compulsory)
SBE111	Ecological Economics	5 (Compulsory)
SBE112	Statistics	5 (Compulsory)

Y2. Toolbox Module (60 ECTS). *Running a Tight Ship*

Code	Course name	ECTS
SBE201	Geographic Information Systems	5 (Compulsory)
SBE202	Digital Data Compilation, Analysis & Visualisation	5 (Compulsory)
SBE203	Sustainable Blue Entrepreneurship & Innovation	5 (Compulsory)
SBE204	Climate Change	5 (Compulsory)
SBE205	Circular Blue Economy	5 (Compulsory)
SBE206	Models for Environmental & Economic Systems	5 (Compulsory)
SBE207	Remote Sensing Data & Techniques	5 (Compulsory)
SBE208	Marine Spatial Planning (MSP) & Integrated Coastal Zone Management (ICZM)	5 (Compulsory)
SBE209	Introduction to Blue Industries	5 (Compulsory)
SBE210	Environmental Accounting	5 (Compulsory)
SBE211	Foundations of Finance	5 (Compulsory)
SBE212	Sustainability Reporting	5 (Compulsory)

Y3. Expertise Module (60 ECTS). *Charting the Course*

Pathway 1. Blue Sustainability Accounting, Management and Planning (UPN/UG)

Code	Course name	ECTS
SBE311-P1	Landscape Planning & Management	5 (Compulsory)
SBE312-P1	Life Cycle Assessment	5 (Compulsory)
SBE313-P1	Environmental Monitoring	5 (Compulsory)
SBE314-P1	Ocean Ecology & Accounting	5 (Compulsory)
SBE315-P1	Aquaculture & Food Security	5 (Compulsory)
SBE316-P1	Sustainable & Climate Finance	5 (Compulsory)
SBE317-P1	Environmental & Urban Planning	5 (Compulsory)
SBE318-P1	Maritime Sustainable Supply Chains	5 (Compulsory)
SBE319-P1	Operation Planning & Management	5 (Compulsory)
SBE401-P1	Option 1 Code (elective). Research oriented Research bachelor project.	15 (Compulsory)
SBE402-P1	Option 2 Code (elective). Professionally oriented. Internship	10 (Compulsory)
	+ Bachelor project	5 (Compulsory)

Pathway 2. Conservation and Sustainable Use of Marine Resources (UG)

Code	Course name	ECTS
SBE321-P2	Protection of the Marine Environment	5 (Compulsory)
SBE322-P2	Ecological Assessment of Aquatic Environments	5 (Compulsory)
SBE323-P2	Sustainable Fisheries Management	5 (Compulsory)
SBE324-P2	Introduction to Marine Biotechnology	5 (Compulsory)
SBE325-P2	Leadership & Communication	5 (Compulsory)
SBE326-P2	Fish Biology	5 (Compulsory)
SBE327-P2	Integrated Aquaculture	5 (Compulsory)
SBE328-P2	Specialised Workshop at Sea & in the Coastal Zone	5 (Compulsory)
SBE329-P2	Mining & Renewable Energy	5 (Compulsory)
SBE401-P2	Option 1 Code (elective). Research oriented Research bachelor project.	15 (Compulsory)
SBE402-P2	Option 2 Code (elective). Professionally oriented. Internship	10 (Compulsory)
	+ Bachelor project	5 (Compulsory)

Pathway 3. Human Impact in the Arctic (NORD)

Code	Course name	ECTS
SBE331-P3	Human Health & Physical Activity related to the Sea; Blue sports	5 (Compulsory)
SBE332-P3	Sustainable Coastal Tourism	5 (Compulsory)
SBE333-P3	Introduction to Marine Biotechnology	5 (Compulsory)
SBE334-P3	Sustainable Fisheries Management	5 (Compulsory)
SBE335-P3	Integrated Aquaculture	5 (Compulsory)
SBE336-P3	Marine Ecosystem Restoration	5 (Compulsory)
SBE337-P3	Geopolitics in the Arctic	5 (Compulsory)
SBE338-P3	Arctic leadership	5 (Compulsory)
SBE339-P3	Human Impact in the Arctic	5 (Compulsory)
SBE401-P3	Option 1 Code (elective). Research oriented Research bachelor project.	15 (Compulsory)
SBE402-P3	Option 2 Code (elective). Professionally oriented. Internship	10 (Compulsory)
	+ Bachelor project	5 (Compulsory)

Pathway 4. Sustainable Port-Tourism Cities (UNIST)

Code	Course name	ECTS
SBE341-P4	Sustainable Shipping & Ports	5 (Compulsory)
SBE342-P4	Sustainable Coastal Tourism	5 (Compulsory)
SBE343-P4	Urban Economics	5 (Compulsory)
SBE344-P4	Migrations & Coastal Populations	5 (Compulsory)
SBE345-P4	Introduction to Marine Biotechnology	5 (Compulsory)
SBE346-P4	Human Health & Physical Activity related to the Sea; Blue Sports	5 (Compulsory)
SBE347-P4	Socio-economic & Environmental Monitoring	5 (Compulsory)
SBE348-P4	Environmental Marketing & Social Awareness	5 (Compulsory)
SBE349-P4	Coastal Resource Strategic Management	5 (Compulsory)
SBE401-P4	Option 1 Code (elective). Research oriented Research bachelor project.	15(Compulsory)
SBE402-P4	Option 2 Code (elective). Professionally oriented. Internship	10(Compulsory)
	+ Bachelor project	5 (Compulsory)

Pathway 5. Blue Management: Accounting, Conservation and Restoration (UCA)

Code	Course name	ECTS
SBE351-P5	Policy, Legal & Regulatory Framework for Blue Management	5 (Compulsory)
SBE352-P5	Data Sources & Processing Tools for Blue Management	5 (Compulsory)
SBE353-P5	Socio-ecological Monitoring	5 (Compulsory)
SBE354-P5	Marine Ecosystem Accounting	5 (Compulsory)
SBE355-P5	Marine Ecosystem Conservation	5 (Compulsory)
SBE356-P5	Marine Ecosystem Restoration	5 (Compulsory)
SBE357-P5	Social Dimension in the Blue Management	5 (Compulsory)
SBE358-P5	Project Management	5 (Compulsory)
SBE359-P5	Innovation & Strategic Development in Blue Management	5 (Compulsory)
SBE401-P5	Option 1 Code (elective). Research oriented Research bachelor project.	15 (Compulsory)
SBE402-P5	Option 2 Code (elective). Professionally oriented. Internship	10 (Compulsory)
	+ Bachelor project	5 (Compulsory)

Pathway 6. Blue Industries: Tourism and Seafood (UAlg/UCA)

Code	Course name	ECTS
SBE361-P6	Sustainable Blue Industries: Tourism & Seafood	5 (Compulsory)
SBE362-P6	Social Dimension of Blue Industries	5 (Compulsory)
SBE363-P6	Policy & Regulatory Framework in Blue Industries	5 (Compulsory)
SBE364-P6	Strategy Management	5 (Compulsory)
SBE365-P6	Life Cycle in Blue Industries	5 (Compulsory)
SBE366-P6	Integrated Aquaculture & Sustainable Fisheries	5 (Compulsory)
SBE367-P6	Marketing & Product Development in Blue Tourism	5 (Compulsory)
SBE368-P6	Seafood Processing & Product Development	5 (Compulsory)
SBE369-P6	Blue Industries Project Management	5 (Compulsory)
SBE401-P6	Option 1 Code (elective). Research oriented Research bachelor project.	15 (Compulsory)
SBE402-P6	Option 2 Code (elective). Professionally oriented. Internship	10 (Compulsory)
	+ Bachelor project	5 (Compulsory)

Y1. Core Module (60 ECTS). *Learning the Ropes*

SBE101. Marine Ecosystems & Biodiversity

Course name: Marine Ecosystems and Biodiversity			
Course Code: SBE101			
Field/area of study: Biology			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course will present the diversity of organisms and ecosystems that shape the ocean environment. It will provide the basis of marine ecology, focusing on the biological and functional diversity of marine ecosystems. The course will explore different coastal and oceanic ecosystems, from different latitudinal ranges, including coastal confined and exposed systems, and epipelagic and deep ecosystems. The course will include the following aspects: The sea as an ecosystem; marine biodiversity and marine habitats; primary and secondary production in the sea; energetics of marine ecosystems, food webs, ecosystem interconnectivity; current biodiversity status and trends, consequences of biodiversity loss as well as international tools for biodiversity management approaches.			

Course Content:

1. **Marine biodiversity (~4h).**

1.1. General Introduction. Definitions, general concepts, framework; Marine tree life. different biological levels and different scales of marine biodiversity; keystone species: methods to measure diversity (biodiversity indexes; species richness; global databases); functional and phylogenetic diversity; biodiversity and ecosystem functioning.

1.2. Taxonomic groups. Phylogenetic evolution of marine species; species systematic identification. Producers, microbes. Invertebrate animals. Fish. Marine mammals and reptiles. Seabirds. Mapping hotspots of diversity and endemism in the global ocean. Animal movement in the ocean.

2. **Marine Ecosystems (12h)**

2.1. Global overview of marine ecosystems (~1h). Types: Open ocean, deep-sea ocean and coastal marine ecosystems. Ecosystem classification schemes.

2.2. Pelagic ecosystems (~4h). The pelagic zones. Inhabitants of the water column, functional groups: phytoplankton, zooplankton, and nekton. Distribution patterns. Introduction to food webs and trophic cascades.

2.3. Coastal and benthic ecosystems (~4h). Relevance of benthic habitats. Types of coastal ecosystems: estuaries, coastal lagoons, mangroves, macroalgal forests, seagrass systems, warm coral reefs, salt marsh/wetlands. Biotic and abiotic components. Coastal communities and food webs.

2.4. Other marine ecosystems (~3h). Polar regions, mesophotic reefs, submarine seamounts and canyons, ocean trenches, biogenic systems, chemosynthetic ecosystems (hydrothermal vents) and/or others.

3. **Present and future of Biodiversity (~2h).** Modified habitats (salt marshes, harbours, cities and urban coasts, artificial reefs). Current status of marine ecosystems and biodiversity loss. Ecosystem management strategies to protect biodiversity.

Keywords: Biodiversity, marine ecosystems, organisms, marine life

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- To understand the meaning and relevance/implications of biodiversity
- To acquire knowledge of the different marine ecosystem types
- To recognize different marine organisms, key species and processes
- To discuss and contrast the structure, trophic dynamics and controls of different types of marine ecosystems
- To recognize the implications of ecosystem interconnectivity
- To recognize the threats on marine biodiversity and tools for conservation

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Lab and field work skills
- Bibliography and resources search skills
- Organisational and Problem-solving
- Oral and writing communication skills
- Assertiveness, reasoning, and critical thinking skills

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Develop sensitivity towards environmental and social problems that affect the marine ecosystem, from ethical commitment and sustainability.

- Issue judgments on relevant issues of a social, scientific or ethical nature that have to do with environmental management; knowing how to collect, interpret and analyse relevant data (knowing the main sources of information); as well as, relate, synthesise and develop critical reasoning
- Adapt to new situations, knowing how to apply and integrate their knowledge (techniques, scientific foundations, proposals, etc.) in any context, both research and professional, from a multidisciplinary perspective.
- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form.
- Develop autonomy and self-capacity to carry out continuous learning, developing, especially, organisational and planning skills.
- Assume leadership and teamwork functions, especially in inter or multidisciplinary environments, developing skills for interpersonal relationships.
- Develop an innovative spirit, fostering knowledge of the most innovative and recent aspects in the evolution of the discipline, practices in the development of projects, as well as the promotion of their creativity.
- Apply their skills in professional activities related to marine biodiversity and ecosystems, through knowledge of the social and professional environment of the discipline at all its scales (from the local, regional to the international) and in all its fields (consultancies, centres of research, public administrations, non-governmental organizations, companies).
- Propose, develop, present and defend scientific and/or technical work in the field of the discipline.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Fieldwork	2	5h x 2s = 10h
Lectures	9	2h x 9s = 18h
Lab sessions	4	2,5h x 4s = 10h
Seminar	1-2	2h (others)
Total teaching contact hours:	40h	
Self - study time	85h	

Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral and written exercises	2h	10-20%
Presentation	2h	30-50%
Report	2000 words	40-60%
Assessment Criteria:		
<ul style="list-style-type: none">• Attendance and participation in class.• Report• Oral Presentation• Written exercises		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...):		
Gaston K.J., Spicer J. I. (2008). Biodiversity: An Introduction. 6th Edition. Blackwell Publishing.		
Goldberg W (2013) The Biology of Reefs and Reef Organisms. Chicago University Press.		
Hogarth, 2015. The Biology of Mangroves and Seagrasses, Oxford University Press.		
Kaiser et al., 2020. Marine Ecology: processes, systems, and impacts, 3rd Ed., Oxford University Press		
Spicer, J.I., Gaston, K.J. (1999). Physiological diversity and its ecological implications. Blackwell Science, Oxford.		
Valiela, 2015. Marine Ecological Processes, 3rd Ed., Springer-Verlag, New York, 698 p.		
Vecchione et al., 2023. The Deep Ocean. Life in the Abyss. Princeton University Press, 288 p.		
Castro P., Huber M.E. 2024. Marine Biology, 12th edition. McGraw-Hill Higher Education publisher.		

SBE102. Ocean Functioning

Course name: Ocean Functioning			
Course Code: SBE102			
Field(s)/area(s) of study: Physical oceanography, ocean dynamics, ocean-atmosphere interaction, large-scale processes, mechanistic models			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ETCS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The primary objectives of this course are to provide students with a general understanding of the functioning of the ocean system, including the main drivers, processes, and feedback mechanisms that control it. The course intends to develop students' ability to recognize the complexity of the ocean system and to have a general understanding of how different physical, chemical, and biological processes interact to control ocean functioning. By the end of the module, students should be able to understand the challenges and opportunities for sustainable ocean management and conservation.			
Course Content:			
This course provides an introductory understanding of the functioning of the ocean system, including the drivers, processes, feedback mechanisms, and synergies that control its behaviour at various spatial (global, basin, meso-			

micro-scale) and temporal scales, such as wind, ocean currents, eddies, tides, waves, mixing, etc. Students will learn about the synergies controlling the ocean functioning, the ocean-atmosphere interaction and global scale processes. The course will also introduce students to mechanistic models as a tool to deepen their understanding of ocean functioning.

Course Objectives:

The main objectives of the course are for students to have a general understanding of:

1. The ocean system at different scales of space and time, and the various processes that control it;
2. The main mechanisms that generate motion in the ocean;
3. The ocean-atmosphere interaction related to energy and carbon storage, climate change and resultant biogeochemical and ecological responses, including global environmental challenges, such as ocean acidification and sea level rise; and to be able to:
4. Recognize the main drivers, processes, feedback mechanisms, and synergies controlling the ocean functioning, and
5. Recognise the role of technology and innovation in monitoring and managing ocean processes and ecosystem services.

Course delivery:

The course will be delivered through a combination of lectures, independent study, and class discussions, and laboratory exercises (such as Copernicus MyOcean or ESA Ocean Virtual Lab). Students will be expected to participate actively. The laboratory exercises will focus on data analysis, use of simple physical models to study ocean functioning, and interpretation of results. Class discussions will provide students with an opportunity to present and apply the concepts learned in this course.

Course Outline:

Introduction to Ocean Functioning

Geography of the world Ocean

Ocean water properties

Overview of the ocean within the Earth Systems context (eg Oceans and Society)

Ocean thermohaline circulation and currents at various spatial and temporal scales

The importance of the ocean to the global climate system

Drivers and Processes of Ocean Functioning

Solar and Earth radiation, sea surface temperature

Winds, waves, ocean currents, tides and coastal processes

Salinity and density; mixing processes (turbulence, dispersion, etc)

Biogeochemical cycles

Feedback Mechanisms and Synergies

Ocean-atmosphere-land feedback mechanisms and synergies

Ocean-biota feedback mechanisms (fronts and upwelling, mixing layers, chlorophyll profiles, Grand-Sverdrup's model, plankton size structure, etc.).

Ocean-Atmosphere Interaction

Large scale phenomena (El niño, La niña, climate patterns, conveyor belt, oligotrophic gyres, etc)

Wind-driven circulation

Heat and carbon storage in the ocean

Introduction to climate regulation and ocean responses

Introduction to ecosystem responses to ocean-atmosphere interaction (such as ocean acidification, etc)

Keywords: ocean dynamics, synergistic ocean processes, spatio-temporal scales, ocean-atmosphere interaction, mechanistic models

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand in general, the ocean system and the interplay of different physical, chemical, and biological processes that control it.
- Recognize the main drivers, processes, feedback mechanisms, and synergies controlling the ocean functioning, including the role of the atmosphere, ocean currents, and the carbon cycle.
- Understand in general, the ocean-atmosphere interaction related to momentum, heat and carbon storage, ocean and ecosystem responses to climate change.
- Value the importance of ocean observing systems

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Demonstrate the complexity of the ocean system and the various processes that control it.
- Acquire a structured thinking about how the ocean works in several ways
- Explain in general, the main drivers, processes, feedback mechanisms, and synergies controlling the ocean functioning.
- Appreciate the ocean-atmosphere interaction, climate change and resultant biogeochemical and ecological responses.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Evaluate, albeit in general, the main drivers, processes, feedback mechanisms, and synergies that control the functioning of the ocean system
- Use their skills to evaluate and assess the strengths and limitations of the knowledge available related to the ocean function.
- Embrace a system thinking approach to understand the interconnected nature of the ocean system and its interactions with the atmosphere, climate, biogeochemical cycles, and ecosystems. They should

recognize the complex feedback loops and interdependencies within the ocean system.

- Apply a good foundation and knowledge of ocean sciences. This will enable them to comprehend and communicate the general mechanisms and processes governing ocean functioning.
- Communicate the multidisciplinary nature of ocean functioning through strong communication skills, both written and oral, which are necessary to convey the ideas, facts and uncertainties related to ocean functioning as learnt through this course.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	13	2h (Total = 26h)
Oral Presentation	1	2h
Lab sessions	6	2h (Total = 12)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	(1), 2000 words	30%
Analysis Task	(1), 3000 words	60%
Presentation	(1) 20-minute oral presentation	10%

Assessment Criteria

Study materials/Course literature: (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...*)

Descriptive physical oceanography: an introduction / Lynne D. Talley ... [et al.]

Introductory oceanography / Harold V. Thurman

Chemical oceanography / by Frank J. Millero.

Ocean circulation / prepared by an Open University course team

Web tools such as Copernicus myocean or ESA oceandatalab

Ethics:

This course encourages open discussions and respectful dialogue on the chosen subject matter, and within the context of environmental justice, climate change, impacts on marginalised communities, environmental sustainability, responsible use of resources, potential environmental impacts of certain practices, and ethical responsibilities of scientists. The course provides a safe space where students feel comfortable expressing their opinions, asking questions, and challenging existing knowledge.

SBE103. Applied Mathematics

Course name: Applied Mathematics			
Course Code: SBE103			
Field/area of study: Mathematics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 100%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites:			
Short course description: The course aims at providing students with a working knowledge of mathematical tools utilised in the fields of Sciences and Economics.			
Course Content: Solving basic equations and inequalities, matrices, systems of linear equations, mathematical functions, limits, differentiation, functions of several variables, plotting, maxima and minima, introduction to integration, linear programming (up to graphical solution of 2d problems).			
Keywords: algebra, functions, calculus, optimisation			
Programme Learning Outcomes (PLOs)			
PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.			
PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.			

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Do algebraic computations
- Solve any number of simultaneous linear equations
- Handle mathematical functions such as power, exponential and logarithmic, absolute value functions
- Use differentiation to obtain maxima and minima of real functions of one or two variables without constraints
- Plot the graph of real functions of one variable
- Find the area under a graph (for example using Wolfram alpha on a browser).

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Formulate and solve a simple real-life problem in mathematical terms
- Demonstrate the abilities of logical and analytical thinking.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Identify the mathematical tools required to tackle a simple real-world problem, solve the problem, provide an appropriate interpretation of the result and judge the validity of the results obtained.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	30	3 hours of lectures daily taught over a spread of 2 weeks; each lecture is of one hour duration
Tutorials	10	1 hour daily

Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	3 hours	30%
Examination	2 hours	70%
Assessment Criteria: Assignment will be split into two parts, part 1 given at the end of week 1 of lecturing, part 2 given at the end of week 2 of lecturing. the 2-hour exam will contain 5 questions all having equal amounts of marks. Students will be asked to choose 4 out of these 5 questions.		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> - Bostock, L., and Chandler, S. (2000) Core Maths for Advanced Level (3rd Ed.), Nelson Thornes - Bostock, L., and Chandler, S. (1981) Mathematics: The Core Course for A-level, Stanley Thornes - Bostock, L., Chandler, S., and Rourke, C. (1982) Further Pure Mathematics, Stanley Thornes - Smedley, R., and Wiseman, G. (2001) Introducing Pure Mathematics (2nd Ed.), Oxford University Press - Bazaraa, M.S., Jarvis, J.J. and Sherali, H.D. (2010) Linear Programming and Network Flows, Wiley, 4th ed.		

SBE104. Foundations of Economics

Course name: Foundations of Economics			
Course Code: SBE104			
Field(s)/area(s) of study: Social Science/Economics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Students can follow the online sessions remotely.	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Foundations of Economics aims to familiarise students with the main concepts and policy implications of economic science. It explores particularly micro- and macroeconomics and issues relating to the theory of the firm. The focus of the course is the rationale behind the decision-making process of key economic actors; namely individuals, households, firms and governments. Students are encouraged to develop critical thinking based on the understanding of key economic concepts, theories and principles and how they relate to the real world. The presentation of concepts is complemented with application-based case studies, particularly from the blue economy.			
Course Content: Part 1: How markets work Module 1: Introduction to the foundations of economics			

- The economy and the economic science (introduction to the discipline)
- Scarcity and efficiency, choice and opportunity costs
- Microeconomics and macroeconomics

Exercise: graphical example of the representation of Production-Possibility Frontier (PPF)

Module 2: Markets

- The market mechanisms: what, how and for whom
- Market failures and government intervention

Exercise: Discussion of news underlining market failure with examples and specific public intervention

Module 3: Supply and demand

- Market equilibria and changes in price and quantity
- The relevance of price elasticity

Exercise: calculating equilibrium price and quantity, demand and supply shifts and the effect on equilibrium price and quantity

Part 2: Consumers and Producers

Module 4: Utility and Consumer behaviour

- Choice and utility (marginal utility and diminishing returns)
- Consumer equilibrium

Exercise: geometrical analysis of the indifference map, budget constraint, the equilibrium

Module 5: Theory of the Firm

- Production
- Costs

Exercise: geometrical analysis of the optimal situation for the firm

Part 3: Macroeconomics and Policies

Module 6: Basic Macroeconomic Principles

- Objectives and instruments of macroeconomic policy
- Measuring the size of an economy: GDP

- Variation in prices: Inflation
- Unemployment
- Business cycles and economic crises

Exercise: Calculation of the economic product (Y) based in simple exercises of system of national accounts

Keywords: economics, markets, microeconomics, macroeconomics

Programme Learning Outcomes (PLOs)

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO3. Describe alternative economic approaches in addition to traditional economic analysis.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

This course is necessary to establish common ground for the comprehension of the blue economy. It introduces students to the foundations of economic thought. Key concepts and tools used in Economics as a discipline for scientific knowledge production are explained. The course presents central concepts of microeconomics and macroeconomics. Importance is given to analysis of real-world case studies. At the end of the semester, students must present understanding of the foundations of knowledge in Economics and of economic processes.

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

1. Describe applications of economic principles in analysing the choices of individuals, households, firms and governments,

2. Use basic microeconomic concepts, principles, and tools in market analysis,
3. Analyse the impact of production factors and costs on the firms' results,
4. Connect the fundamental concepts of macroeconomics,

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

1. Communicate economic knowledge, ideas and solutions both orally and in writing,
2. Demonstrate creative and critical thinking on contemporary issues in economics.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

1. Reveal basic understanding of economic problems,
2. Demonstrate graphical and basic numerical skills in addressing economic problems,
3. Solve simple economic models in order to explain microeconomic behaviours,
4. Apply relevant economic concepts in understanding and analysing real world scenarios with the intent of making informed decisions.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lectures	8	2h x 8s (Total 16h)
Oral Presentation (from students)	2	2h x 2s (Total 4h)
Practical Study-unit	8	2h x 8s (Total 16h)
Seminar	2	2h x 2s (Total 4h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	1	50%
Presentation	1	15%
Report	1	35%
Participation in classes	Participation in continuous assessment implies the presence in a minimum of 60% of the synchronous classes (face-to-face, blended and online)	Compulsory for continuous assessment participation
<p>Assessment Criteria: The examination regulations and the assessment of the achieved learning outcomes should correspond with the intended learning outcomes. They should be applied consistently among partner institutions.</p> <p>a) Continuous assessment: Requiring the participation of students in the classes, it is based on an individual or group (up to three students) of 1 report (35% of the final mark), the oral presentation of this report in the class (total duration: around 15 minutes) (15%), and an individual final test (50%). The students must have a minimum of 7.5 points in each moment of the continuous assessment to approve in the discipline.</p> <p>b) Final Exam (100%)</p>		
<p>Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...):</i></p> <p>Basic readings:</p> <p>The Core Team. (2022). The Economy: Economics for a Changing World [e-book version]. Retrieved from https://core-econ.org/the-economy</p> <p>Samuelson, P.A., Nordhaus, W.D. (2009). Economics, 19th Edition, McGraw Hill.</p> <p>Other materials will be distributed by the teaching team, including short videos (up to 10 min) on basic economic concepts.</p> <p>Youtube Crashcourse: https://thecrashcourse.com/topic/economics/</p>		

SBE105. Introduction to Sustainable Blue Development

Course name: Introduction to Sustainable Blue Development			
Course Code: SBE105			
Field(s)/area(s) of study: Economics, Environment, Social Studies, Sustainability			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims to empower students with a strong understanding of blue sustainable development and equip them with the knowledge and skills to address its challenges. Students will explore the intersection of economics, social and political theory, and ecology within cultural contexts, gaining insights into sustainable development issues in the blue sector. Topics covered include the background of sustainable development, global environmental problems, measurement of sustainability indicators, and management and policy strategies. In addition, students will analyse the demand for resources versus the ocean's biocapacity, the challenge of respecting the sea and carrying capacity, and the transition to a society that embraces biophysical limits and prioritises human well-being and conservation of ocean values. With a focus on global, national, regional, and local levels, this course prepares students to identify and tackle the critical challenges in blue sustainable development. The course will foster students to co-create an intercultural			

activity related to sustainable blue development (e.g., podcasts/pitches). Students will contribute to advancing sustainable practices in the blue economy by fostering interdisciplinary perspectives and encouraging innovative thinking.

Course Content:

1. Introduction to Sustainable Blue Development

- Definition and Principles of sustainable development and History
- Significance and relevance of sustainable development in the context of the blue sector
- Overview of global sustainable issues and their impacts on the blue sector
- Understanding the ecological, economic, cultural, social, technical, and governmental dimensions of sustainable development and SDGs

2. Ocean Ecosystems and the Blue Economy

- The role of marine ecosystems and biodiversity in sustainable blue development and threats
- Importance of healthy oceans for sustainable development and economic growth in the blue economy
- The impacts of pollution on marine ecosystems, human health, and economic activities
- Climate Change and Ocean Acidification in the Blue Economy

3. Demand, Resources, and Ocean Biocapacity

- Challenges posed by resource demand and its impact on the ocean's biocapacity
- Understanding the concept of carrying capacity and its relevance to sustainable blue development
- Strategies for balancing resource utilisation with the conservation of ocean values

4. Challenges in global, national, and local blue sustainable development

- Significant challenges in global, European, and national blue sustainable development
- Role and involvement of stakeholders in addressing challenges in the blue sector
- Innovative approaches and solutions to overcome challenges in the field

- Measurement and sustainability indicators

5. Blue Economy and Sustainable Economic Development

- Economic sectors and activities within the blue economy
- Strategies for promoting economic growth while ensuring environmental sustainability in the blue sector
- Case studies of successful models for sustainable economic development in the blue economy
- Innovation, Research, and Technology in Blue Development

6. Governance and Policies for Blue Development from European and national

perspectives

- Overview of international legal frameworks and agreements related to the blue sector
- Role of international organisations in promoting sustainable blue development
- Challenges and complexities of managing transboundary resources and fostering international cooperation

Keywords: Blue Economy, Sustainability Aspects, SDGs, Governance & Policies, Sustainability Indicators (SIs)

Programme Learning Outcomes (PLOs)

PLO1. Understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio- ecological perspective.

PLO2. Interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO3. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO4. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO5. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO6. Develop sensitivity towards environmental and socio-economic problems in the ocean based on sustainability.

PLO7. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

1. Understand the principles and concepts of sustainable development and their application in the context of blue sustainable development.
2. Identify and describe the environmental challenges and global issues that impact the sustainability of the oceans and coastal areas.
3. Explain the interrelationships between the blue economy's ecological, economic, technical, and social factors and their influence on sustainable development outcomes.
4. Identify the measurement tools, sustainability indicators, and assessment frameworks used to evaluate and monitor sustainable blue development.
5. Analyse the concept of carrying capacity and its significance in managing and preserving the ocean's resources.
6. Understand the obstacles to and premises for the reaching of solutions to pressing global problems of health, natural resource management, economic redistribution and poverty reduction and democratisation from prospective of the blue economy.
7. Compare management and policy approaches at the global, national, and regional levels, including governance mechanisms and international frameworks.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

1. Apply critical thinking and analytical skills to assess and evaluate the challenges and opportunities
2. Communicate effectively, orally and in writing, about the complex issues and concepts related to blue sustainable development
3. Employ research skills to gather, evaluate, and synthesise relevant information
4. Integrate the sustainable blue economy approaches and strategies into the professional practice
5. Work in intercultural and multidisciplinary teams

6. Demonstrate effective teamwork and collaboration skills by actively engaging in group discussions, projects, and activities

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

1. Critical Thinking: Develop the ability to analyse complex issues in blue sustainable development, evaluate evidence, and generate well-reasoned solutions.
2. Interdisciplinary Approach: Apply knowledge from economics, social and political theory, and ecology to understand and address challenges in the blue sustainable development field.
3. Effective Communication: Master the skills to convey ideas, concepts, and findings related to blue sustainable development through clear and persuasive communication, both orally and in writing.
4. Research and Information Literacy: Acquire skills in locating, evaluating, and synthesising relevant information from various sources to support evidence-based decision-making in blue sustainable development.
5. Problem-solving: Cultivate the ability to identify and propose innovative solutions to complex challenges faced in blue sustainable development, considering social, economic, and environmental dimensions.
6. Collaboration and Teamwork: Foster effective collaboration and teamwork skills by engaging with peers and stakeholders from diverse backgrounds, respecting different perspectives, and working together towards common goals in sustainable blue development.
7. These competencies highlight the essential skills students will develop throughout the course, enabling them to approach blue sustainable development challenges with critical thinking, interdisciplinary perspectives, effective communication, and collaborative problem-solving abilities.
8. Hybrid learning & teaching approach: effective combination of face-to-face meetings and digital technologies
9. Flipped classroom approach: some meetings will be structured around the idea that lecture or direct instruction is not the best use of class time. Students will encounter information before class, freeing class time for activities that involve higher order thinking using either digital tools / modelling or performing fieldwork activities.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

- Lectures

<ul style="list-style-type: none">- Seminars- Fieldwork- Oral presentations- Podcasts and pitches		
Method	Number of sessions	Duration
Fieldwork: <i>Visit to organisations (public, private, social, e.g., NGOs) involved sustainable development activities</i>	1	4 hours (Total: 4h)
Lectures	8	1 hour (Total: 8h)
Oral presentation <i>Presentation of the student project</i>	4	1 hour (Total: 4h)
Practical Study-unit <i>Creating a podcast</i>	8	1 hour (Total: 8h)
Seminar	1	2 hours (Total: 2h)
Tutorials. <i>Involving a group of students, i.e., a team working on the same assignment) F2F, or online</i>	4	0.5 hour (Total: 2h)
Online learning. <i>Pre-recorded lectures, videos, and web links related to the course topics; flipped classrooms (max. 30%)</i>	12	1 hour (Total: 12h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination		50%
Multiple-choice tests in each class		20%
Presentation (pitch or podcast where each group presents their project)		10%
Project (group work assignment)		20%
Assessment Criteria: <ul style="list-style-type: none"> - 10 % Create a pitch (less than 3 minutes) or a podcast (only one episode using audio, max. 15 minutes) as a team of 3-5 students presenting the application of sustainable blue economy development in the environment, e.g., regional, local, and global (from discussion between lecturer and student groups). - 20 % Deliver a report (max. 12 pages with references) on the project as a support to the pitch or podcast. - 20 % Multiple-choice tests during the teaching unit that will cover the content of the previous lecture. - 50 % Final written exam (face-to-face or online). 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i>		
Moodle/other: Learning materials (under construction), short articles – case studies, presentations for the course with updated videos, podcasts, movies.		
Any item can be selected as a mandatory source by the teacher.		
A suggested list of readings includes non-mandatory sources:		
Action Brief: An Ocean of Opportunities - How the Blue Economy Can Transform Sustainable Development in Small Islands Developing States. Available at: https://www.undp.org/publications/action-brief-ocean-opportunities-how-blue-economy-can-transform-sustainable-development-small-islands-developing-states		
Blue Economy and Blue Finance: Toward Sustainable Development and Ocean Governance. Available at: https://www.adb.org/publications/blue-economy-and-blue-finance-toward-sustainable-development-and-ocean-governance		

Brears, R.C. (2021). Developing the Blue Economy, Palgrave Macmillan, Nature Springer

European Commission. (2013). Blue Growth: Smart Specialisation Strategies for Sustainable Development.

European Green Deal: Developing a sustainable blue economy in the European Union. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_2341

https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/sustainable-blue-economy_en#publications

Listening to the Present, Designing the Future: A Guide to Deep Listening. Available at: <https://www.undp.org/publications/listening-present-designing-future-guide-deep-listening>

OECD. (2016). The Future of the Ocean Economy: Exploring the Prospects for Emerging Ocean Industries to 2030.

Pauli, G. (2010). The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs. Paradigm Pubns.

Roberts, C. (2013). The Ocean of Life: The Fate of Man and the Sea. Penguin Books

Sustainability criteria for the blue economy. Available at: <https://op.europa.eu/en/publication-detail/-/publication/893c5ae2-a63a-11eb-9585-01aa75ed71a1>

Inclusiveness:

In this course, we ensure the equal treatment and diversity of all students through common workshops, fieldwork, common tutorials, and examination. All students have to introduce themselves to the students' community at the beginning of the course where all barriers will be removed. Students including minorities will be well integrated in study groups through random assignment of a lecturer.

Ethics:

The ethical concerns are mostly referred to students who will attempt to perform interviews and surveys with the human participants-stakeholders. All ethical concerns will be resolved through the ethical committee if required.

SBE106. Soft & Academic Skills

Course name: Soft and Academic Skills			
Course Code: SBE106			
Field(s)/area(s) of study: Academic and Professional English			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course will introduce students to a range of transversal skills that will enhance their learning process while increasing their knowledge, abilities, and potential. Through a combination of lectures and workshops, students will be encouraged to explore and appreciate the main characteristics of ESPP (English for Scientific and Professional Purposes) in its written and oral forms. The course will present a number of essential student skills, including planning, time management, information selection, note-taking and memorization strategies. Course delivery will include both guidance lectures and interactive activities to boost student participation and encourage the development of autonomous learning strategies when studying and writing in an academic context. Critical analytical thinking, and metacognitive reflection will be encouraged with regard to both reading and writing. The course will further focus on the indispensable tools required for information and digital literacy, including those related to AI. Students will be taught how to use non-electronic sources of information from university libraries and elsewhere. Referencing			

protocols for external materials will also be introduced, with a strong emphasis on issues of plagiarism and other breaches of academic integrity. The skills required for delivering effective presentations will be discussed and further developed.

Course Content:

Week	Unit	Title	Description
1	1	ESPP (English for Scientific and Professional Purposes) and the writing process	Introduction to ESPP (its main characteristics, genres, register, etc.); academic writing as a process (phases, time management, roles, authorial stance, etc.)
1	2	Critical thinking and analysis	Developing critical and analytical thinking skills; evaluating the quality of information sources; language functions (agreeing and disagreeing, classifying, comparing and contrasting, paraphrasing, summarising, etc.)
1	3	Using the Internet and non-digital sources + AI tools	Guidelines for using Internet sources for academic purposes; accessing and using non-digital sources, including university libraries; using AI tools for HE (automatic translation tools); interpreting diagrams, figures and mathematical formulae using specialised vocabulary
1	4	Active listening, note-taking, and memorization strategies	Effective note-taking methods and systems; memory techniques for improved retention
1	5	Oral communication and public speaking	Preparing effective presentations
2	6	Essay writing	Introduction, main body Conclusion, title and abstract

2	7	Referencing and avoiding plagiarism	Paper citation techniques and formats; understanding and avoiding plagiarism
2	8	Text revision and editing	Sentence structure; common errors; punctuation
2	9	Intercultural diversity in academia	National and international academic standards (with a special focus on the countries involved in the Alliance)
2	10	Academic (oral) communication and public speaking	Delivering presentations
Keywords: ESPP (English for Scientific and Professional Purposes), academic skills, soft skills, critical analytical thinking, digital literacy, academic integrity.			
Learning outcomes Transversal skills This course will foster critical thinking, problem-solving, and the capacity for independent learning, necessary for the students' academic critical thinking, problem-solving abilities, and the capacity for independent learning, necessary for employment or further academic pursuits. <ul style="list-style-type: none"> • QF-EHEA-4: can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences; • QF-EHEA-5: have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy. 			
Course Learning Outcomes (CLOs): 1. Knowledge: <i>knowledge is described as theoretical and/or factual.</i> <u>By the end of the course the student will be able to:</u> a. Identify and describe the main characteristics of ESPP (English for Scientific and Professional Purposes) in its written and oral forms; b. List (and distinguish between) different potential sources of academic material, both print and electronic; c. Use AI tools, Internet and non-digital sources for academic purposes;			

- d. Identify the different parts of an essay and their characteristics;
- e. Define plagiarism and explain why this is a serious breach of academic integrity;
- f. Analyse the impact of AI-based technologies on the quality of academic production;
- g. Recognize and know about different national and international academic standards.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- a. Apply key principles of time management and work planning;
- b. Take and make effective notes on the basis of lectures delivered;
- c. Search for source material on academic search engines and subject directories;
- d. Critically evaluate the quality of published/electronic material;
- e. Read academic material selectively and critically;
- f. Deliver effective presentations, based on an understanding of key skills involved;
- g. Identify and use techniques for improving memorization strategies;
- h. Provide references for any external materials used;
- i. Detect instances of possible plagiarism in their own work;
- j. Write an essay;
- k. Develop intercultural skills;
- l. Recognize essential elements (key words) in a more complex specialised text and produce shorter specialised texts based upon given key words;
- m. Interpret diagrams, schemes, figures and mathematical formulae orally and in written form using specialised vocabulary.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

By the end of the course the students will be able to autonomously search for source material, critically evaluate published material, interpret diagrams, schemes and formulae. The students will be able to write an essay or deliver a presentation on a topic from their field of study using relevant sources of

academic material, AI tools, Internet and non-digital sources for academic purposes without resorting to plagiarism, following guidelines of academic integrity.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*) See pdf with definitions of teaching and learning methods (separate document).

The course is delivered via three main methods:

- (i) Lectures: 20 h
- (ii) Workshops & group work: 20 h
- (iii) Tutorials

Method	Number of sessions	Duration
Lectures		20h
Workshops & group work		20h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Assignments and Online activities	10% of the final grade
Essay	During the assessment week: essay (1500-2000 words) on same topic as oral presentation (done as homework)	40% of the final grade
Oral Examination	During the assessment week: 10 minutes individual oral presentation (same topic as essay)	40% of the final grade
Attendance	Minimum 70% of attendance	10% of the final grade

Assessment Criteria:

Essay: content, communicative achievement, organisation, language (accurate grammar, appropriate vocabulary and register)

Oral presentation: Content and organisation of the presentation; delivery – in particular, assessment of speaking skills including pronunciation, fluency, the use of appropriate terminology and the ability to express viewpoints and opinions in a clear and convincing manner.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

I) Study materials for lecturers:

Benesch, Sarah. (2001). Critical English for Academic Purposes: Theory, Politics, and Practice. Mahwah Lawrence Erlbaum Associates, Inc.

Hyland, Ken. (2006). English for Academic Purposes. An advanced resource book. Abingdon, New York: Routledge.

Paquot, Magali. (2010) Academic Vocabulary in Learner Writing. From Extraction to Analysis. New York, London: Continuum.

II) Study materials for students:

McCarthy, Michael; O'Dell, Felicity. (2008). Academic Vocabulary in Use. Cambridge: Cambridge University Press.

Powell, Mark. (2011). Dynamic Presentations. Cambridge: Cambridge University Press.

Wallwork, Adrian. (2013). English for Academic Research: Writing Exercises. New York, Heidelberg, Dordrecht, London: Springer.

Wallwork, Adrian. (2014). User Guides, Manuals, and Technical Writing. New York, Heidelberg, Dordrecht, London: Springer.

Writing in English A Practical Handbook for Scientific and Technical Writers (2000) (A Pilot Project sponsored and funded by the European Commission Leonardo da Vinci programme) Project Partners Zuzana Svobodova, Technical University Brno, Czech Republic Heidrun Katzorke and Ursula Jaekel, Technische Universität, Chemnitz, Germany Stefania Dugovicova and Mike Scoggin, Comenius University, Bratislava, Slovakia Peter Treacher, ELT Centre, University of Essex, England.

<https://www.bloomsbury.com/uk/study-skills-handbook-9781137610874/>

<https://www.bloomsbury.com/uk/reading-at-university-9781352009163/>

<https://www.bloomsbury.com/uk/cite-them-right-9781350933453/>

<https://www.bristol.ac.uk/academic-language/media/BEAP/>

SBE107. Marine Natural Capital & Ecosystem Services

Course name: Marine Natural Capital and Ecosystem Services			
Course Code: SBE107			
Field(s)/area(s) of study: Ecology, Marine Sciences, Social Sciences			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course will introduce the concepts of natural capital and ecosystem service, using the theory of Blue Socio-Ecological Systems (B-SES) to provide a content frame defining the interdependencies between humans and ocean. The course will address the identification and assessment of goods and services provided by marine ecosystems, how the social part of the SES benefits from the ecological one, how to measure and value marine natural capital and ecosystem services, what features of marine ecosystems drive these values, and the difficulties faced by environmental managers in conserving marine natural capital and ecosystem services.			
Course Content: 1. Notion of natural capital. Natural capital components. Renewable and non-renewable marine natural capital stocks. 2. Critical natural capital. Strong and weak sustainability.			

3. Notion of ecosystem services, main international initiatives (MEA, TEEB, IPBES, CICES), and classification systems.
4. ES cascade model. Relationships between ecosystem services and beneficiaries (society), including human impacts.
5. Status and trends of marine natural capital and ecosystem services.
6. How to measure and value marine natural capital and ecosystem services.
7. Conservation and sustainable exploitation of marine natural capital and ecosystem services.
8. Field and case studies highlighting examples of marine natural capital and ecosystem goods and services.

Keywords: Natural capital; Ecosystem services; Marine ecosystems; Human-ocean interactions; Goods and services; Environmental management;

Programme Learning Outcomes (PLOs)

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand the meaning of natural capital and its relationship with marine ecosystems.
- Understand the typologies of ecosystem services and the main services provided by marine ecosystems.
- Relate ecosystem services to human well-being.
- Acknowledge the influence and impacts of humans on natural capital and ecosystem services.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Speak and communicate in scientific and socially accessible language about natural capital and ecosystem services.

- Ability to relate ecosystems to flows of services and main beneficiaries.
- Ability to identify main coastal marine ecosystems and the ecosystem services they provide.
- Ability to perform biophysical and economic assessment of marine natural capital and ecosystem services.
- Be able to identify and assess the level of influence of human activities on natural capital and ecosystem services.
- Computer skills to work with ecosystem services assessment.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Skills in linguistic communication both for the university environment and for society.
- Digital skills for the use of general and specific tools.
- Resourceful skills for participation and motivation in the classroom and elsewhere.
- Social skills, learning to learn and working in groups.
- Critical thinking on the topic of marine natural capital and ecosystem services.
- Skills in assessing human influence on natural capital and ecosystem services.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Fieldwork	2	3h (total = 6h)
Lectures	11	2h (total = 22h)
Oral presentation	1	2h (total = 2h)
Lab sessions	2	2h (total = 4h)
Seminar	3	2h (total = 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination		60%
Project		40%
Assessment Criteria: <ul style="list-style-type: none"> • Completion of an oral exam with the theoretical contents. • Development of a project on marine natural capital-ecosystem services and human well-being relationships. • Presentation of project reports by students. • Attendance and participation in classes, seminars, fieldwork and lab sessions. 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i>		
- Selected scientific articles and reports. Textbook to be decided.		

SBE108. Impact of Human Activities on the Ocean

Course name: Impact of Human Activities on the Ocean			
Course Code: SBE108			
Field(s)/area(s) of study: Biology, Ecology, Chemistry, Physics, Toxicity, Geology			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of this course is, first, to identify the different human stressors in the marine environment and their interactions. Such human stressors cause different classes of impacts of physical, chemical, and/or biological nature that affect the normal functioning of the ocean and coastal areas. Secondly, the module also focuses on the effects of such impacts on the marine ecosystems, economy and human health.			
Course Content: - Introduction: human stressors in the marine environment, general concepts, direct/indirect drivers, types of impacts, DPSIR framework (drivers, pressure, state, impact, response). - Land of use change, habitat loss and subsidies: urbanisation of coastal areas, how different uses of land affect ecosystems, how populations are affected by			

subsidies -> effects towards ecosystems, human well-being, and blue economy sectors.

- **Overexploitation of marine resources:** type of fisheries, artisanal vs. industrial fisheries, CPUs, ecological and economic impacts on biodiversity and stocks such as by-catch, derelict fishing gears, marine litter. Possible seminar: use of Ecopath with Ecosim for overfishing.

- **Invasive species:** vectors and pathways of marine bioinvasions (e.g., ballast water), the invasion process, processes / mechanisms behind invasion success, ecological / socio-economic / human health impacts of alien species. Actions and legislation for invasion's management.

- **Marine pollution:**

Pollution by urban and industrial wastewater discharges and other coastal activities such as aquaculture, different contaminants involved and their effects, including eutrophication by nutrients, bioaccumulation of contaminants, endocrine disrupting compounds, litter and plastics, and chemical emerging contaminants -> effects towards ecosystems, human well-being, and blue economy sectors. Seminar on EQC model for contaminant modelling.

Pollution by maritime transport, including air pollution, wildlife strikes, sewage discharges and oil spills, acoustic pollution, impact of cruise industry on tourism destinations -> effects towards ecosystems, human well-being, and blue economy sectors. Supervision of the human well-being at ports. Conditions of work on board. The accomplishment of the ILO Conventions and the Directives about working at the sea (merchant maritime, fishing and coasting).

- **Upcoming challenges:** new foreseen threats towards the marine environment and how current and future impacts will be affected in the long-term by ocean acidification, warming, and sea level rise -> effects towards ecosystems, human well-being, and blue economy sectors.

Keywords: human stressors, land of use change, habitat loss, marine pollution, overexploitation, invasive species

Programme Learning Outcomes (PLOs): Please, delete those that do not fit with the course content.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs)

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- To understand the impacts of human activities on the ocean
- To acquire knowledge of the different methods to assess such impacts
- To recognize different key processes involved in such impacts
- To know tools for impact management and minimization

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Lab and field work skills
- Bibliography and resources search skills
- Organisational and Problem-solving
- Oral and writing communication skills
- Assertiveness, reasoning, and critical thinking skills

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Develop sensitivity towards environmental and socioeconomic problems that affect the impacted marine ecosystems.
- Issue judgments on relevant issues of a social, scientific or ethical nature that have to do with environmental management; knowing how to collect, interpret and analyse relevant data (knowing the main sources of information); as well as, relate, synthesise and develop critical reasoning
- Adapt to new situations, knowing how to apply and integrate their knowledge (techniques, scientific foundations, proposals, etc.) in any context, both research and professional, from a multidisciplinary perspective.

- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form.
- Develop autonomy and self-capacity to carry out continuous learning, developing, especially, organisational and planning skills.
- Assume leadership and teamwork functions, especially in inter or multidisciplinary environments, developing skills for interpersonal relationships.
- Develop an innovative spirit, fostering knowledge of the most innovative and recent aspects in the evolution of the discipline, practices in the development of projects, as well as the promotion of their creativity.
- Apply their skills in professional activities related to impact recognition, management, and minimization, through knowledge of the social and professional environment of the discipline at all its scales (from the local, regional to the international) and in all its fields (consultancies, centres of research, public administrations, non-governmental organisations, companies).
- Propose, develop, present and defend scientific and/or technical work in the field of the discipline.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Fieldwork	1	Total = 4h
Lectures	15	2h (Total = 30h)
Lab sessions	1	Total = 4h
Seminar	1	Total = 2h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case Study (take home)	2h	25%
Examination	2h	50%

Presentation	2h	25%
Assessment Criteria: Attendance and participation in class. Report Oral Presentation Written exercises		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> Marine Ecology: Processes, Systems, and Impacts. 2020. Kaiser et al. Oxford Press Modern Treatment Strategies for Marine Pollution. 2020. Kumar et al. Elsevier Marine Pollution – Monitoring, Management and Mitigation. 2023. Reichelt-Brushett et al. Springer Impact of Climate Changes on Marine Environments. 2015. Zielinski et al. Springer		

SBE109. Blue Business Management

Course name: Blue Business Management			
Course Code: SBE109			
Field(s)/area(s) of study: strategic management; innovation management			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>The course aims to provide an understanding of basic management theories, concepts, and tools for driving the analysis and the decision-making of managers in blue business operations / activities. Blue Business involves working with and through others to effectively achieve the goals of the blue organisation by efficiently using limited blue resources in the changing world.</p> <p>The course will introduce the fundamental principles of business management, as well as key notions of organisational management, including strategy building and the management of human resources for implementation of the strategy. It will introduce students to the manager's role in identifying opportunities to create competitive advantages for blue economy companies. It will discuss the internal organisation of firms, its functions, and aspects related to innovation management, as well as contextual factors that frame the firm's activities, such as maritime policy and maritime clusters.</p>			

The course will introduce the notion of business models, and inter-organizational cooperation and competition in maritime value chains. It will allow students to focus on selected processes in managing blue economy companies.

Course Content:

The course content is based on management functions - business planning and decision-making, business organisation, human resource management, leadership, and controlling.

-Introduction to blue business management

- o Introduction to blue businesses and the blue industry. The basic terms and concepts in the blue industry. Role and importance of the blue economy and the main sectors. The blue industry value chain.

-Blue organisations: internal functioning of organisation

- o The management process in the blue business, including management functions, strategy building, and organisational design.
- o Blue products and services. Controlling and the control system in the blue business. Value chain model: definition and limits. An introduction for assessing blue business competitiveness, business success, and sustainability. Cross culture management – a leadership challenge.

-Environmental and competitive context

- o The blue industry's competitiveness, trends, and critical sustainability challenges. An introduction to business models for sustainability. The blue industry in a VUCA (volatile, uncertain, complex, ambiguous) world. Coopetition in the strategy of the blue business partners.
- o Factors in the external environment and how this influence blue business management: PESTLE analysis of business environment; 'Porter's 5 Forces analysis. Analysis of key success factors.
- o Blue business 'ecosystem' and its characteristics; value networks and role of clusters. Blue business stakeholders.
- o Organisational change management.

-Management functions

- o Basic management functions (planning, organising, staffing, motivating and controlling blue business activities, and the concept of change management); foresight and strategy-building in organisations, leadership, human resource management. Planning and business plans for a blue organisation. An outline on business plans, financial planning, and budgeting in the blue business.

- o Organization of business activities and tasks in a blue business. Controlling and the control system in the blue business.

-Specific management functions

- o Planning and management across different sectors.
- o Innovation management and foresight, entrepreneurship, and value creation.

-New topics in the management of blue business

Addressing challenges of blue businesses, e.g., resilience, new technology frontiers, and technological advancements; Artificial intelligence and robotics and their impacts on blue businesses; Information and communication technologies (ICT); IoT; and smart blue business. Blue resources usage.

Keywords: blue business management; strategic management; management functions; sustainable business models

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them with a wide socio-ecological perspective.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. Describe the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course, the student will be able to:

- Interpret essential management functions and understand their purpose in sustainable blue business management
- Identify the challenges related to the strategic management of the firm
- Recognize how to integrate sustainability principles into decision-making processes and blue business strategies
- Characterise the different economic activities present in the blue economy, including the role of maritime clusters, business models, and their life cycle

- Characterise the environmental challenges businesses face today, including climate change, resource depletion, pollution, and biodiversity loss (environmental awareness), and comprehend sustainable utilisation of blue resources

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Integrate vital management concepts and skills in blue firms' operational and strategic management
- Interpret and critically assess the elements in the business environment influencing a blue firm's competitiveness and sustainable growth using essential management tools, e.g., using the SWOT or PESTLE matrix
- Efficiently use organisational resources, including relational resources, i.e., resources related to relations with external stakeholders, i.e., customers, suppliers, recipients, competitors, and social environment.
- Prepare and present a sustainability business plan or a start-up business plan integrating diverse aspects of the business operations, mission and vision, goals, and strategy (e.g., 3R concept).

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Communication (oral, written, and digital) and cooperation skills to work in a multicultural environment and a multidisciplinary team
- Critical thinking skills necessary to interpret and analyse complex problems and skills to tackle future uncertainties (in particular, the differences in problem-solving)
- Managerial skills (e.g., conflict management, interpersonal skills, planning and strategic thinking, leadership, interviewing).

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lectures	12	2 h x 12 = Total 24 hours
Seminar	2 (invited industry speakers and seminars)	2 h x 2= Total 4 hours
Online learning	4 (Asynchronous session, pre-recording or online forum)	2 h x 4= Total 8 hours

Group Learning	2 (students working in groups on assignment project)	2 h x 2= Total 4 hours
Total teaching contact hours:	40 hours	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	X 3,000words	80%
Presentation	X 15 minutes	20%
Assessment Criteria		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)		
Combe, C. (2022). Introduction to global sustainable management.		
Douma, S., & Schreuder, H. (2017). Economic approaches to organizations (6. utg.). Harlow: Pearson Education.		
Grant, R. M. (2021). Contemporary strategy analysis. John Wiley & Sons. (Chapter 1-8 1 The Concept of Strategy - 2 Goals, Values, and Performance - 3 Industry Analysis: The Fundamentals - 4 Further Topics in Industry and Competitive Analysis - 5 Analyzing Resources and Capabilities - 6 Organization Structure and Management Systems: The Fundamentals of Strategy Implementation - 7 The Sources and Dimensions of Competitive Advantage 141 - 8 Industry Evolution and Strategic Change)		
Griffin, R. W., & India, C. (2013). Management Principles and Practices 11th. Canada. (chapter 2: The Environment of Organization and Managers; Chapter 3 Planning and Strategic Management)		
Koontz, H., & Weihrich, H. (2014). Essentials of management: an international and leadership perspective.		
Mintzberg, H. (2023). Understanding organizations... Finally! Structuring in sevens. Berrett-Koehler Publishers. (Specific chapters suggested by teaching staff)		
Principles of Management OpenStax (2019), Rice University (freely downloadable at:		

https://assets.openstax.org/oscms-prodcms/media/documents/PrinciplesofManagement-OP_mGBMvoU.pdf)

Web-based resources:

European Union, Blue Growth Smart Specialisation Platform. Accessible at: <https://s3platform.jrc.ec.europa.eu/blue-growth>

European Commission (2023) The Blue Economy Report 2023. Accessible at: <https://op.europa.eu/en/publication-detail/-/publication/9a345396-f9e9-11ed-a05c-01aa75ed71a1>

OECD. The Ocean Initiative. Accessible at: <https://www.oecd.org/ocean/>

Further/additional reading:

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers* (Vol. 1). John Wiley & Sons.

Johnson, J., Whittington, R., Regnér, P., Angwin, D., Johnson, G., & Scholes, K. (2020). *Exploring strategy*. Pearson UK.

Schwarz, J. O. (2023). *Strategic foresight: an introductory guide to practice*. Routledge.

Wit, B. D., & Meyer, R. (2005). *Strategy synthesis: Resolving strategy paradoxes to create competitive advantage*.

SBE110. Marine & Maritime Governance, Laws & Regulations

Course name: Marine and Maritime Governance, Laws and Regulations			
Course Code: SBE110			
Field(s)/area(s) of study: Legal Studies			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course will enable students to gain knowledge about the rules that regulate the use of the marine environment, its resources and diversity.			
Course Content: The course provides an overview of global ocean governance and law. The achievement of the goal of sustainability of the oceans and their invaluable resources requires concerted efforts by all States at national, regional and global level. For this purpose, to avoid a piecemeal approach to addressing the threats the oceans are facing, policies and legislation must ensure a sustainable governance framework. Essential topics are basic concepts about international law and law of the sea. The course also introduces substantive elements of ocean law and policy, e.g., conservation of living marine resources, sustainable use of the oceans, Blue Economy, and maritime security.			
Introduction to Public International Law and Law of the Sea (1 ECTS)			

- Binding nature of law
- Law v. policy
- Sources of international and European law
- Subjects of international law
- Jurisdiction: coastal state, flag state, port state
- Maritime zones

Conservation of Living Marine Resources. Sustainable Use of the Oceans (1 ECTS)

- Marine pollution
- Dumping
- Climate change
- Conservation and Biodiversity Loss
- Regional approach

Blue Economy (1 ECTS)

- Fisheries
- Area Based Management Tools
- Energy generation
- Shipping: carriage of goods by sea
- Tourism
- Regional approach

Case studies (1 ECTS)

Maritime security (1 ECTS)

- Piracy
- Maritime terrorism
- Smuggling of migrants by sea
- Human rights at sea
- Regional approach

Keywords: ocean governance, conservation, blue economy, maritime security

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Have a general understanding of what is the law of the sea and its fundamental principles
- Understand the importance of the international legal and institutional frameworks for the sustainable use of resources in the sea
- Understand the interdisciplinary and comparative approach to ocean governance
- Comprehend key legal and policy issues regarding ocean governance

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Identify contemporary policy and legal issues relating to ocean governance
- Identify the strengths and weaknesses of the current legal framework concerned with ocean governance

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Recognize current and future challenges in marine governance
- Apply knowledge to different/novel circumstances
- Contribute to current discussions on behalf of governments, NGOs or other stakeholders

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	40	1h (Total 40 x 1h) 40h
Total teaching contact hours:	40h	
Self - study time	85h	

Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	5000 words	20%
Case Study (take home)	2000 words	10%
Examination	2 hours	50%
Oral Presentation	1 hour (0,3 hours pr student)	20%
Assessment Criteria: Examination 70% and assignment 30%		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)		
<ul style="list-style-type: none">• Simone Borg, Felicity Attard, Patricia (Mallia) Vella de Fremeaux (eds), Research Handbook on Ocean Governance Law, Edgar Elgar Publishing, 2023.• David Joseph Attard, Malgosia Fitzmaurice and Norman A. Martinez Gutierrez (eds), The IMLI Manual on International Maritime Law – Volume I: The Law of the Sea, Oxford University Press, 2014.• Yoshifumi Tanaka, The International Law of the Sea, Third Edition, Cambridge University Press, 2019		
Inclusiveness: The teaching activities in the course will be conducted in an inclusive manner – plenary lectures will be able to follow from distance, and group assignment planned in a gender-balanced way.		
Ethics: Ethical considerations need to be part of the transdisciplinary research methodology.		
Examples of ethical topics:		
<ul style="list-style-type: none">• Human rights protection• Environmental ethics• Freedom of the Seas• Common Heritage of Mankind		

SBE111. Ecological Economics

Course name: Ecological Economics			
Course Code: SBE111			
Field(s)/area(s) of study: Sustainability, nature, society and economics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course will present ecological economics as an alternative perspective to neoclassical / conventional economics and show how ecological economics can address policy-making issues regarding the environmental sustainability of the economic system and of the blue economy in particular. An overview of methods to evaluate ecosystems and environmental goods and services in monetary terms will be provided, as well as methods to evaluate and operationalise the ecological footprint and environmental impact of projects.			
Course Content:			
Block #1 (12 hours):			
The economic theory perspectives on the environment. Overview of ecological and environmental economics: history, world views, concepts, and objectives. Strengths and weaknesses. Complementarity between both perspectives. The main authors in ecological economics. The main			

approaches in ecological economics (i.e. the scale, distribution, allocation framework; steady-state economics, post-growth, and de-growth). Ecological systems, their structure and functioning, and the interdependencies among the economy, the society and the environment.

Block # 2 (14 hours):

A taxonomy of value in ecological economics: difference between instrumental value, inherent value and intrinsic value. Private goods, public goods, merit goods, and club goods. Environmental externalities (à la Pigou) and cost shifting (à la Kapp).

Methods to evaluate ecosystems and environmental goods and services in monetary terms. Methods to evaluate and operationalise the ecological footprint and environmental impact of projects: from cost-benefit analysis to alternatives, including methods based on deliberative and democratic processes.

Exploration of case studies and real-world applications of ecological economics principles and tools, i.e. to the marine environment.

Block #3 (14 hours):

Introduction to the institutions and governance structures that shape environmental decision-making at international, national, regional, and local level.

Policy-making indicators: sustainable development, quality of life, ecosystem values.

Study of policy instruments rooted in ecological economics.

Analysis of policy successes and failures, and the lessons learned from different contexts and sectors. Transferability of policies across locations and across sectors (i.e. towards the blue economy sector).

Keywords: Environmental challenges, ecological economics, sustainability, resource allocation, degrowth

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Describe alternative economic approaches in addition to traditional economic analysis.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Describe and criticise alternative economic approaches in addition to traditional economic analysis.
- Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.
- Identify the different economic policy actors and stakeholder groups in ocean and marine -based industries.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Provide a knowledge framework to reconcile conflicting uses of the ocean and sea and their resources, and enable long-term sustainable development.
- Analyse policies and mechanisms that facilitate sustainable use of the ocean/sea and maximise benefits and value creation for current and future generations.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- To develop sensitivity towards environmental and socio-economics problems in the ocean/sea based on ethical commitment and sustainability.
- To have a general knowledge of the fundamental principles of ecological and environmental economics.

<ul style="list-style-type: none">• To know the instruments and techniques for the assessment of impacts on the environment.• To be skilled in the practical use of environmental and socio-economic analysis tools.• To know the socio-economic activities of stakeholders linked to the marine environment, from a sustainability perspective.• To adopt an interdisciplinary mindset.		
Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)		
Method	Number of sessions	Duration
Lectures	10	2h (Total 20h)
Project	5	2h (Total 10h)
Group Learning /Seminars	5	2h (Total 10h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral Examination	15 minutes	30%
Presentation	20 minutes	30%
Report	20 pages	40%
Assessment Criteria: Knowledge and understanding achievement, clarity of exposition, teamwork competence. The reports will be prepared by small groups of students (e.g. including 3-4 students per group). The oral examination aims to assess the individual mastery of the topics included in the course programme.		
Study materials/Course literature: (<i>hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature</i>)		

Costanza, R., Cumberland, J.H., Daly, H., Goodland, R., Norgaard, R.B., Kubiszewski, I. and Franco, C. (2015). *An Introduction to Ecological Economics*. Routledge would cover quite much of the concept and ideas.

Costanza, R. (1989). What is ecological economics?, *Ecological Economics*, Volume 1, Issue 1, 1989, Pages 1-7, ISSN 0921-8009, [https://doi.org/10.1016/0921-8009\(89\)90020-7](https://doi.org/10.1016/0921-8009(89)90020-7).

Vatn, A. (2016). *Environmental Governance. Institutions, Policies and Actions*, Edward Elgar Publishing.

Optional:

Barbier E.B., *Rethinking the Economic Recovery, A global green new deal*, Cambridge Univ. Press, Cambridge 2010.

SBE112. Statistics

Course name: Statistics			
Course Code: SBE112			
Field/area of study: Statistics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 100%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course will introduce students to basic statistical concepts, with an emphasis on practical application using Excel to analyse data related to some of the blue economy main topics.			
Course Content: Population and sampling Sampling techniques Types of Data Descriptive Statistics and Frequency Distributions Graphical Forms of Presentation Measures of Central Tendency			

<p>Measures of Dispersion</p> <p>Probability Distributions</p> <p>Principles for Point and Interval Estimation</p> <p>Calculation of Sample Size</p> <p>Introduction to Hypothesis Testing</p> <p>Effect Size</p> <p>Test on means and test on difference of two means</p> <p>Test on proportions and tests on difference of proportions</p> <p>Chi-Square Test for Independence</p> <p>Linear Regression and Correlation.</p>
<p>Keywords: data visualisation, probability, statistical analysis, statistical inference</p>
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Formulate a real-life problem into a statistical framework and identify the nature of the variables involved • Identify the appropriate sampling techniques • Discriminate between different statistical methods according to the specified problem • Understand the difference between sample statistics and population parameters • Distinguish between point estimates and interval estimates • Use statistical inference methods to draw conclusions based on a sample. <p>2. <u>Skills</u> (know-how): <i>Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Apply the statistical methods using Excel to summarise and analyse data

- Compute point estimates, and obtain confidence intervals for population means, proportions, difference of means and difference of proportions
- Conduct hypothesis testing for various population parameters
- Give proper interpretation to statistical outputs
- Propose appropriate solutions to problems based on statistical methods
- Address limitations of proposed methods
- Prepare a statistical report using Excel.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Using Excel for statistical analysis
- Applying statistical analysis in different fields
- Ability to communicate data analysis results to the right audience
- Writing a statistical report.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	10	3h (Total 30h)
Tutorials	10	1h (Total 10h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Analysis Task	min 10 pages, max 25 pages	40%
Examination	2 hours - computer assisted	50%
Presentation	10 minutes	10%

Assessment Criteria:

The student must pass the exam and the analysis task to receive the final grade.

Exam (50%) - Written computer-assisted exam

Analysis task (40%) - Minimum 10 pages, maximum 25 pages. Lecturer will provide feedback on draft versions of the assignment.

Presentation (10%) - For the analysis task, students are required to analyse a dataset and prepare an individual report based on their findings. Subsequently, each student will be required to present their analysis in a solo presentation.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

- Agresti A, Franklin C, Klingenberg B,. Statistics - The Art and Science of Learning from Data (2017) - 4th Edition, Pearson. ISBN 13: 978-0-321-99783-8

- Miller, I and Miller, M (2014) John E. Freund's Mathematical Statistics with Applications (Classic Version) (Pearson Modern Classics for Advanced Statistics Series) 8th Edition, Pearson Education Ltd

- Triola, M. (2017) Elementary Statistics (13th Edition), Pearson

-- Rumsey, D. J. (2016) Statistics for Dummies (2nd Edition).

Y2. Toolbox Module (60 ECTS). *Running a Tight Ship*

SBE201. Geographic Information Systems

Course name: Geographic Information Systems			
Course Code: SBE201			
Field/area of study: Geography			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The goal of this course is to provide students with an opportunity to gain knowledge in the theory and methods of Geographic Information Systems (open platform such as Q-GIS) and their application in geosciences. The course will cover the basic principles and functions of GIS, data handling, and spatial analysis, as well as knowledge of the main sources of spatial data (e.g. population, navigation, protected areas, habitat mapping, niche modelling). The lectures are supplemented with practical sessions and assignments, through which the students will develop practical skills for analysing, visualising and synthesising geoscientific data, and the principles for applying these skills to address geoscientific problems.			

Course Content:

1. Introduction to GIS (4h): Definitions, concepts, framework, structure;
2. Cartography (4h): The representation of Earth: three-dimensional modelling (sphere, ellipsoid, geoid) and representation on plan; classification of maps; scale ratio and symbolism; geographic, Cartesian and plane coordinates; map projections; reference systems.
3. Numerical Cartography (6h): Raster format; vector format; geometric primitives, topological attributes and relationships; levels of information (layers); digitalization of cartography; georeferencing raster images and vector graphics.
4. GIS functions (6h) – Spatial analysis fundamentals; Query of GIS databases through SQL language; layer composition; layout organisation; construction of thematic maps; realisation of respect areas (buffer).
5. Marine and Coastal GIS (4h): characteristics, components and goals; study cases.
6. GIS applications (16h): introduction to free and open source GIS software (Q-GIS) use; map and database management; vectorization; association of databases to vector cartography; query and selection from GIS database; thematic map construction; design and implementation of GIS for marine and coastal applications.

Keywords: Cartography, Geography, Geoprocessing, Spatial Analysis.

Programme Learning Outcomes (PLOs)

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

Knowledge of the composition, structure, and organisation of the ocean at ecosystem level. The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualifications framework(s); Disciplinary field: The intended learning outcomes should comprise knowledge, skills, and competencies in the respective disciplinary field(s); Achievement: The programme should be able to demonstrate that the intended learning outcomes are achieved.

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- To understand the meaning and relevance/implications of GIS;
- To acquire knowledge of the different map projections;
 - To recognize and manage different cartographic digital formats (raster and vector);
- To analyse geographic databases and interpret thematic maps;
- To select materials and methods for GIS design and implementation.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Lab and field work skills;
- Bibliography and resources search skills;
- Organisational and Problem-solving;
- Oral and writing communication skills;
- Assertiveness, reasoning, and critical thinking skills;
- Spatial Analysis skills;
- Geoprocessing Analysis skills;
- Data management and analysis.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Adaptation and integration of their knowledge (techniques, scientific foundations, proposals, etc.) in any context, both research and professional, from a multidisciplinary perspective;
- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form;
- Develop autonomy and self-capacity to assume leadership and teamwork functions, especially in inter or multidisciplinary environments;
- Carry out continuous learning, developing, especially, organisational and planning skills.
- Apply their skills in professional activities related to different fields of blue economy, involving social and professional environment aspects at various scales (from the local, regional to the international);
- Develop autonomy and self-capacity to interact with different actors in different frameworks (consultancies, centres of research, public administrations, non-governmental organisations, companies).

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	10	2h x 10 = Total 20h
Seminar	10	2h x 10 = Total 20h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral and Written Exercises		20-30%
Presentation		20-30%
Project		50%

Assessment Criteria:

- Attendance and participation in class; Workbook, Seminar Paper
- Project Report; Logbook, Fieldwork

- Project Presentation; Portfolio
- Oral and Written Exercises.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

"GIS Fundamentals: A First Text on Geographic Information Systems" by Paul Bolstad.

"Mastering QGIS" by Kurt Menke, Dr. Richard Smith Jr., Dr. Luigi Pirelli, Dr. John Van Hoesen.

"Geospatial Analysis - A Comprehensive Guide" by de Smith, Goodchild, and Longley.

QGIS User Guide. https://docs.qgis.org/3.34/en/docs/user_manual/index.html

QGIS Training Manual.
https://docs.qgis.org/3.34/en/docs/training_manual/index.html

MIT OpenCourseWare: Geographic Information System (GIS) Tutorial.
<https://ocw.mit.edu/courses/res-str-001-geographic-information-system-gis-tutorial-january-iap-2022/pages/gis-level-1/>

SBE202. Digital Data Compilation, Analysis & Visualisation

Course name: Digital data compilation, analysis and visualisation			
Course Code: SBE202			
Field(s)/area(s) of study: Data Science, Multidisciplinary			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course focuses on providing a strong foundation and practical skills in data analytics and programming abilities that includes, data compilation, standardisation, integration, analysis, and visualisation ensuring that students are well-prepared for real-world applications. Furthermore, there are two key aims incorporated into the course structure. The first aim is to encourage students to delve into specific seminar topics early in the course, and the second aim is to have them apply their knowledge to collaborative group projects that weave those topics into a comprehensive, real-world narrative. These aims are achieved by providing a balanced approach between individual research and group work. During the evaluation week, assessments and feedback are collected to foster a deeper understanding of the subject matter and to promote teamwork and critical thinking skills.			

Course Content:

Week 1: Foundation Programming Skills Development accompanied by idea generation.

Day 1: Introduction to Data Compilation and Standardization

- Course introduction, objectives, and seminar guidelines.
- The importance of data compilation and standardisation.
- Hands-on exercises for data cleaning and standardisation – as a part of the seminar on specific topic related to the course (e.g. acquiring and cleaning a specific dataset)

Day 2: Data Types and Integration

- Exploring different data types (met-ocean, climate, coastal, socioeconomic, and other fields).
- Importance of data; why need data literacy.
- Techniques for data integration and merging datasets.
- Best practices on data exchange and FAIR principles, learn about the legal principles of data sharing.
- Practical examples with real-world data accompanied by discussion on potential seminar topics and research questions.
- Use of data in problem solving and data-based assessments such as through visual analysis and professional data analysis toolboxes.

Day 3: Introduction to Relevant Software Packages

- Students are introduced to different types and formats of data. They will be trained in hands-on sessions to use such data to identify, understand, and quantify relevant marine and climate processes, identify their temporal and spatial scales, and extract knowledge for economical assessments and management.
- Overview of software tools (e.g., ArcGIS, QGIS, Ocean Data View).
- Hands-on sessions with each software for data manipulation and visualisation.
- How software packages can be used for specific seminar topics.

Day 4: Basic Programming for Data Analysis

- Introduction to programming for data analysis.
- Options: Introduction to Matlab (for a dedicated session) and/or Introduction to Python.

- Introduction to data science and artificial intelligence for data processing.

- Basic coding exercises with application to seminar.

Day 5: Linux Scripting Basics

- Introduction to the Unix-like Linux command-line interface.
- Scripting for automating data management tasks.
- Students submit their seminar proposals, including their chosen topics and research questions – feedback is obtained by teachers and peers (internally and externally with other simultaneous groups at other universities)

Week 2: Advanced Programming Skills Application with time allocation for seminar and group work

Day 6: Spatial Analysis

- Introduction to spatial analysis for environmental studies.
- Practical exercises with ArcGIS, QGIS, and spatial analysis techniques.
- Seminar work guided and over sighted by teachers.

Day 7: Data Visualization for Effective Communication

- The importance of data visualisation in data analysis and presentation.
- Hands-on exercises to create informative data visualisations (infographics, gifs etc.).
- Introduction to ethical and responsible data handling practices, including data privacy and security.
- Group formation based on common themes or complementary seminar topics.

Day 8: Project-Based Learning

- Assignment of a real-world project to the formed groups (e.g. port sustainability assessment, marine energy feasibility study at specific location, spatial analysis for tourism development).
- Students apply skills learned in data compilation, standardisation, integration, analysis, and visualisation to their projects.

Day 9: Project Work and Preparation

- Students continue working on their projects, with guidance and support.
- Instructor reviews progress and provides feedback.

Day 10: Pre-final Project Presentations

- Students present their projects, including data compilation, standardisation, analysis, and visualisation, to the class.
- Groups practise presenting their integrated projects to the class.
- Receive feedback and guidance from teachers.

Note: these activities of Day 10 should be done in synergy with all the institutions simultaneously ensuring fusion of potentially different perspectives which would enrich the total experience (following the FAQ #11 description).

Keywords: Data science, standardisation, spatial analysis techniques, datasets, data sharing

Programme Learning Outcomes (PLOs):

PLO1. Achieve Advanced Programming Skills Application to manage multidisciplinary data with cutting-edge capabilities in the blue industries.

PLO2. Develop awareness of environmental and socio-economic problems related to blue economy from a data analytics perspective.

PLO3. To understand the impact of socio-economic activities linked to the marine environment from a data analytics perspective.

PLO4. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, from data analytics.

Course Learning Outcomes (CLOs):

This course is designed to equip students with the essential skills and knowledge required to excel in the field of digital data compilation, analysis, and visualisation. Within course structure a specific highlight is given to the data science approach in real-world problems applied in both seminar and group work.

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Describe the Role of Digital Data in Diverse Disciplines: Understand the significance of digital data compilation, analysis, and visualisation in various fields, including oceanography and socioeconomics.
- Data Compilation and Standardization: Explain the processes and importance of data compilation and standardisation for diverse data types.
- Data Integration and Analysis: Demonstrate proficiency in integrating and analysing data from multiple sources to extract valuable insights.
- Data Visualization Techniques: Utilise a range of data visualisation techniques and tools to effectively communicate complex data.

- **Spatial Analysis Skills:** Apply spatial analysis tools, including Ocean Data View, ArcGIS, and QGIS, to address environmental and geographical challenges.
- **Programming for Data Analysis:** Utilise programming languages such as Matlab/Python for data processing and Linux scripting for data analysis and operational system setup.
- **Ethical Data Handling:** Recognize the importance of ethical and responsible data handling practices, including data privacy and security.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- **Effective Communication:** Students will be able to communicate their data findings, knowledge, and solutions clearly and persuasively, both in oral and written forms.
- **Critical Thinking and Problem Solving:** Develop creative and critical thinking skills to address contemporary challenges in data compilation, analysis, and visualisation.
- **Teamwork and Collaboration:** Collaborate effectively with peers in group projects, fostering a cooperative spirit and enhancing their ability to work as part of a team.
- **Data Literacy:** Attain a high level of data literacy, enabling students to understand, manipulate, and interpret data effectively.
- **Adaptability:** Acquire the ability to adapt to new data analysis tools and technologies as they emerge in the ever-evolving field of digital data management.
- **Project Management:** Develop project management skills, as students will work on individual seminars and group projects that require effective planning and execution.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Proficiency in data compilation, standardisation, integration, analysis, and visualisation.
- Effective data communication, critical thinking, problem-solving, and data literacy.
- Collaborative and adaptive data management.
- Ethical data stewardship and responsibility.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
--------	--------------------	----------

Lectures	10	2h (total 20h)
Project	5	2h (total 10h)
Seminar	4	1h (total 4h)
Group Learning	3	2h (total 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods: Portfolio: Continuous assessment for all the seminar and group work summarised on a course Portfolio (each student must have their individual Portfolio which is the sum of their individual tasks and group works) -10% A systematic and organised collection of a student's work that exhibits to others the direct evidence of a student's efforts, achievements, and progress over a period of time. It should include representative work, providing a documentation of the learner's performance and a basis for evaluation of the student's progress. Evaluation Week: Group Project Presentations and General Quiz Day 11: Group Project Presentations <ul style="list-style-type: none"> Each group presents their integrated project, demonstrating how individual seminar topics contribute to the larger narrative. Evaluation and feedback from both peers and teachers. Group project evaluation by teachers - 50% Day 12: Assessment and Course Review <ul style="list-style-type: none"> Final general and standardised exam (same in all institutions) - 40% Course review, discussion of key takeaways, and future opportunities in the field.		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination		40%
Project		50%
Portfolio (Continuous assessment for all the		10%

seminar and group work)		
Assessment Criteria: Portfolio: Continuous assessment for all the seminar and group work - 10% Group Project Presentations - 50% General Quiz - 40%		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)</i> * Copernicus https://marine.copernicus.eu/ * Geoviewer https://emodnet.ec.europa.eu/geoviewer/ * Learn to Code https://www.w3schools.com/ * Ocean Data View https://odv.awi.de/ * Ocean Teacher https://classroom.oceanteacher.org/ Dedicated sessions in the programme link to the CMEMS and EMODnet portals, and to other specialised data platforms (such as for ARGO floats and earth observations).		
Further information: <i>If you would like to add anything else, please, add below.</i> SEAU initiative training itinerary to further studies Short intensive course Master Programme https://capemalta.net/seaeu-data-literacy/concept.html#training-objectives		
Ethics: Ethical considerations need to be part of the transdisciplinary research methodology. <ul style="list-style-type: none"> • Best practices on data exchange and FAIR principles, learn about the legal principles of data sharing. 		

SBE203. Sustainable Blue Entrepreneurship & Innovation

Course name: Sustainable Blue Entrepreneurship and Innovation			
Course Code: SBE203			
Field(s)/area(s) of study: Economics and Management			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of the course is to familiarise students with the key aspects of entrepreneurship and innovation, and to highlight the opportunities for a sustainable blue economy (SBE). Case studies applied to different blue industries will be covered. A business idea will then be developed around a sustainable concept. The focus will be on blue entrepreneurship, where students will rethink how to mobilise and manage resources, especially marine and maritime resources, and how to create new socio-economic and employment opportunities.			
Course Content: Part I: Framing Blue Entrepreneurship and Innovation 1.1. Fundamentals of Entrepreneurship 1.2. Fundamentals of Innovation			

1.3. The Relevance of Entrepreneurship - Innovation in the SBE

Part II: Relevant Topics for Blue Entrepreneurship and Innovation

2.1. Market Analysis and Feasibility

2.2. Funding and Financing a Blue Business

2.3. Future Trends and Emerging Issues in the SBE

Part III: Innovation and Technology in the SBE

3.1. Emerging technologies in marine and maritime sectors

3.2. Engaging with coastal communities, social entrepreneurship in the SBE

3.3. Innovative case studies from key regional SBE sub-sectors

Part IV: Entrepreneurial Mindset in the Blue Economy

4.1. Developing entrepreneurial skills and competencies

4.2. Tools for creating innovative ideas

4.3. Identifying opportunities in the SBE

4.4. Promoting sustainability and ethics in blue entrepreneurship

4.5. In-depth analysis of successful Blue Economy start-ups

4.6. Career opportunities and pathways in the SBE

Part V: Business Idea and Pitching

5.1. Developing a business idea for a SBE venture

5.2. Presenting a business idea for a SBE venture

Keywords: Entrepreneurship, Innovation, Blue industries, Entrepreneurial skills, Business Idea

Programme Learning Outcomes (PLOs):

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

By the end of the unit, the student will be able to:

1. understand different sectors such as marine biotechnology, fisheries, aquaculture, marine tourism and renewable energy,
2. use entrepreneurial skills to identify and create business opportunities within the SBE,
3. explore innovative strategies for sustainable development within the Blue Economy,
4. gain knowledge of key aspects of business creation,
5. improve presentation and networking skills in a professional environment,
6. improve their digital skills and green skills.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

During the course, students have access to relevant textbooks, research papers and industry reports. They will be encouraged to engage with local SBE companies and organisations and to interact with relevant organisations to gain practical experience. When possible, the course will prepare field trips to SBE organisations, such as thematic S&T parks and incubators. Guest speakers from successful SBE start-ups, government agencies and NGOs will be invited to share their experiences and insights (mainly in Part III). Students will work on an SBE idea, applying the knowledge and skills gained throughout the course, preparing an investor pitch and an (preliminary) idea/business plan.

Method	Number of sessions	Duration
Fieldwork	6	12h
Lectures	9	18h
Project	3	6h
Seminar	2	4h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods:

Two modes of assessment: Continuous assessment or assessment by final examination.

Continuous assessment components

- Individual essay (30%): Discussion on a topic relevant to the innovation and entrepreneurship, inspired by a case, a documentary, article or guest speaker of the course, to be chosen by each student. Expected length: approximately 6 pages, 2,000 words. Submission: to be sent in PDF format by email in the first half of the semester.

From the beginning of the course, the students will be encouraged to progressively define their work group and idea to explore.

- Final report on a business idea, group work up to 3 students, about 5,000 words (45%), following a template to be distributed, to be sent in PDF, by e-mail at the end of the semester.

- Oral presentation of the business idea, using slideshow, video or other kind of presentation (25%).

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Essay	2,000, based in a innovation/entrepreneurship case study	30%
Presentation	30 minutes	25%
Report	5,000 words, SBE idea	45%

Assessment Criteria

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)

Suggested textbooks:

- Innovation and Entrepreneurship, by Mike Kennard
- Entrepreneurship and Innovation - Theory, Practice and Context, by Tim Mazzarol and Sophie Reboud
- Relevant scientific articles will be distributed, such as:
- Exploring future research and innovation directions for a sustainable blue economy
- Unravelling the entrepreneurial mindset | Small Business Economics

SBE204. Climate Change

Course name: Climate Change			
Course Code: SBE204			
Field/area of study: Earth system science			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of this course is to acquaint students at the primary level with the basics of functioning of the Earth's climate system, the causes of contemporary climate change, spatial diversity and trends in climate change in different regions of the world, the influence of climate change on marine economy sector and methods of climate change mitigation and adaptation .			
Course Content: The course has been designed to cover the basics (primary level) of climate change studies. Students will be exposed to a variety of theoretical and practical content, such as case studies, small research projects and visiting stakeholders (if appropriate). INDICATIVE OUTLINE <u>Introduction to climate and climate variability:</u>			

- Concepts & Sources of climate and weather information
- Forms of energy and transfer mechanisms
- Earth-Sun relationships & Earth's Energy Budget
- Atmospheric Properties: Temperature/Humidity, stability, clouds & precipitation, pressure & wind
- The Global circulation & weather systems: mid-latitude frontal cyclones, severe weather
- Climates of the world

Basis of climate change science:

- Causes of contemporary climate change
- Energy balance modelling (one dimension; single slab atmosphere / no clouds) leading to the concept of global warming.
- Patterns of climate change: spatial and temporal diversity
- Challenges and uncertainties in projecting future climate scenarios

Climate change impacts:

- Climate change and its impacts on coastal areas.
- Influence of climate change on marine ecosystems
- Influence of climate change on coastal populations
- Influence of climate change on marine economy

Methods on climate change analyses, mitigation, and adaptation:

- Basis for climate data analyses (e.g., trend significance analyses, data mining) and modelling (including subject-specific software) to estimate future sea level rise as a function of different emission scenarios)
- Social and economic responses to climate change
- Policy instruments and institutions for climate change governance
- Case studies for national and corporate response to climate change

The politics of climate change:

- Major organisations and fora directly concerned with climate change (e.g., IPCC, UNFCCC, COP).
- History of climate change meetings and international agreements

Keywords: climatology, climate change, coastal and marine ecosystems, politics of climate change.

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand the basics of Earth's climate: energy and heat exchanges within the earth-atmosphere system, variables influencing climate and graphic representations of various climate components.
- Understand global climate change caused by human activities.
- Identify a range of challenges associated with managing a changing climate at different scales: from global to local.
- Understand how climate change led to reduced marine biodiversity.
- Think critically and analyse the influence of greenhouse gases on quality of life.
- Understand the impact of climate change on marine ecosystems function and services
- Critically analyse examples of social and economic responses to climate change, and how climate change derived issues cuts across science and social science boundaries.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Describe the way climate change science works, the ways in which future climate will change, and the importance of understanding uncertainty.
- Compare and critically analyse different approaches to responding to climate change at a variety of scales and in a range of settings.
- Propose and argue how to harmonise human activities with the maintenance of a healthy natural and social environment.
- Propose the ways of sustainable acting and environment preservation for future generations.
- Demonstrate understanding of both theoretical debates and empirical issues through case studies and grounded examples.
- Develop an ability to link policies at national and international scales to climate actions.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Demonstrate expertise in the critical analyses of science-led discussions and uncertainties.
- Develop a variety of verbal and written communication skills, including the synthesis of information, communication via visual media, and the development of a well-argued and evidenced position.
- Plan and apply acquired knowledge in everyday life.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Teaching / Learning consisting of 3 broad elements:

ELEMENT 1 – Theory: deals with the impact of climate and environmental changes on people and the environment in different regions from the Arctic to the Tropics. Learning about large-scale climate patterns and changes in different climate zones. Several specific issues such as availability and use of water resources, ocean acidification, etc. Emphasis on processes and interactions in geographic context, as well as the economic/societal impact of changes.

ELEMENT 2 - Field work (site to be selected by module tutor/s): Allows students to extend their theoretical knowledge through field observations and visits to key stakeholders. Application of theoretical knowledge to day-to-day and future actions in a region. Data could be collected during the field trip for further work.

ELEMENT 3 - Seminars/workshops/practicum: Tutored discussions, or practical sessions to explore areas of debate and develop students' ability to critically appraise and question a range of scientific information. It will enable students to develop their skills in understanding the relationship between climate science and climate policy, critically analysing approaches to respond to climate change in a comparative context. It will also allow students to develop an ability to debate and ask questions in a public forum, as well as investigate case studies. Some may include data analysis/modelling.

Method	Number of sessions	Duration
Fieldwork	1 full day or 2 half-days	10 hours, depending on how fieldwork is distributed.
Lectures (Can include other learning methods such as seminars, debates, workshops, and group learning)	See next cell	30 hours for lectures and class activities. Distributed by module leader/s.
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	To assess students' understanding / knowledge of learning outcomes (could be a case study, mixed-exam methods, problem-solving skills test, etc.)	50%
Report	To assess practicum, seminars, workshop, and/or fieldwork.	50%

Assessment Criteria:

Students to demonstrate their interdisciplinary understanding of climate change, including the mechanisms of climate science, its uncertainties, scientific debates, modelling and measuring methods, and the ways in which the challenges of responding to climate change vary between actors and

across different scales, and their knowledge of the dynamics and consequences of a variety of social and economic responses.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)*

Reading list:

- Howes EL, Joos F, Eakin CM and Gattuso J-P (2015) An updated synthesis of the observed and projected impacts of climate change on the chemical, physical and biological processes in the oceans. *Front. Mar. Sci.* 2:36
- PCC Synthesis Report IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 p.
- Lee Hannah (2014) *Climate Change Biology*. 2nd Edition. ISBN: 9780124202184. Academic Press, pp. 470
- Roger G. Barry and Richard J. Chorley (2009) *Atmosphere, Weather and Climate*, 9th edition.
- Wallace J M and Hobbs PV (2006) *Atmospheric Science: An Introductory Survey*, Second Edition, Academic Press
- Withgott & Laposata (2016) *Environment: The Science behind the Stories*, Global Edition. ISBN: 9781292110899. Pearson.

Additional: Copernicus User Learning Services – free resources and tutorials (<https://climate.copernicus.eu/user-learning-services>)

SBE205. Circular Blue Economy

Course name: Circular Blue Economy			
Course Code: SBE205			
Field(s)/area(s) of study: Business and Management, Environmental Economics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Circular Economy has been recognized by policymakers, researchers and businesses alike, as the new economic model and a new thinking that aims to maintain the value of products and materials for as long as possible and to minimise resource use and waste. This can be achieved through strategies that aim to slow down the resources, to close loops between the post-use and production, and strategies increasing resource efficiency. The transition to more circularity is also particularly relevant in (the context of) the blue economy, where the vast majority of sectors depend on bio-resources and the proper functioning of marine ecosystems. The course allows students to gain an understanding of the basic concepts of circularity, the drivers and barriers of circularity, as well get an overview of the circularity efforts in diverse regional and blue industry contexts, explore relevant circular business cases (using different strategies, e.g. repurposing of sails and recycling of fishing gear, and packaging material using marine			

biomass wastes), relevant circular business models, and understand the role of innovation, collaboration and value chains as well as the drivers and barriers of circularity in the blue economy.

Course Content:

The course is structured in 4 modules, each having two sessions:

Module 1 (Introduction) consists of:

Session 1: Anthropocene, our oceans and circularity; Defining circular economy (CE), circular blue economy (CBE) and the basic concepts; connection to other sustainability related concepts;

Session 2: Blue economy as a relevant sector to study circular economy; Blue resources as the basis for circularity; Emerging issues in CE and CBE and connection to SDGs.

Module 2 (The catalysts, barriers, and activities) consists of:

Session 3: Drivers and barriers of CE and CBE with special emphasis on policy; The loops and Rs of circular economy;

Session 4: Innovation and collaboration for circular economy; The role of science and entrepreneurship.

Module 3 (Blue Circular Economy in Practice) consists of:

Session 5: Global perspectives & Implementing the CE in Blue in regions;

Session 6: Blue sectors and CE/CBE

Module 4 (Pursuing circularity in Business) consists of:

Session 7: Strategies and circular business models for CE and CBE;

Session 8: Consists of a field trip and group learning as students work with real life cases - which also gives the basis to start working on the Case Study (take home) for assessment.

Keywords: circular economy, circular transition, blue circular economy, catalysts for circularity

Programme Learning Outcomes (PLOs): Please, delete those that do not fit with the course content.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge:

By the end of the course the student will be able to:

- Understand the main concepts and emerging issues of circular economy and circular blue economy.
- Being able to argument how the blue economy can contribute to more circularity and sustainable development.
- Identify vital blue resources and interpret their significance in the context of SDGs and circular economy.
- Apply knowledge of circular economy drivers and barriers in the private and public sector related to the blue economy.
- Interpret and clarify how innovation, collaboration and value chains can transform blue businesses towards a circular economy.
- Recognize the role of public science and entrepreneurship for fostering circularity.

2. Skills

By the end of the course the student will be able to:

- Utilise different analytical tools within CE.
- Interlink the circular blue economy with SDGs.
- Analyse and critically assess the foundations of the circular economy in diverse blue economy settings.
- Evaluate circular solutions through the value retention-oriented CE frameworks.

- Analyse and compare circular strategies and business models within the blue economy.

3. **Competences:**

By the end of the course the student will be able to:

- Work in multicultural and multidisciplinary teams and demonstrate their communication skills (oral, written, and digital)
- Debate and negotiate different perspectives of the problems by providing convincing arguments.
- Be creative in designing circular economy innovation in new and established businesses.
- Coordinate different elements within the blue economy ecosystem.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Fieldwork	1	6h
Lectures	7	2h (Total 14h)
Online learning (partially related to a session delivery and partially to online materials)	2	5h (Total 10h)
Group Learning (e.g., brainstorming sessions, debates, role playing, exercise...)	5	2h (Total 10h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case Study (take home)	words: 3000-4000	60%

Max 5 people each team		
Reflective Diary	words: 200-300 words per session - total: 1400 words in total	40%
Assessment Criteria: 40 % to deliver a Reflective diary on each session - reflection on learning outcomes. 60 % to deliver the group-work based Case study report.		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...).</i> Compulsory readings: Bocken N. M. P., de Pauw, I. Bakker, C. & van der Grinten, B. (2016) Product design and business model strategies for a circular economy. Journal of Industrial and Production Engineering, 33 (5), 308-320. Brown, P., Von Daniels, C., Bocken, N. M. P., & Balkenende, A. R. (2021). A process model for collaboration in circular oriented innovation. Journal of Cleaner Production, 286, 125499. CPMR Intermediterranean Commission and MedWaves, the UNEP/MAP Regional Activity Centre for SCP. (2022). A Circular Blue Economy for the Mediterranean: Current practices and opportunities. Available at: https://www.medwaves-centre.org/wp-content/uploads/2022/06/A-Circular-Blue-Economy-for-the-Mediterranean-SwitchMed.pdf . Di Vaio, A., Hasan, S., Palladino, R., & Hassan, R. (2023). The transition towards circular economy and waste within accounting and accountability models: A systematic literature review and conceptual framework. Environment, development and sustainability, 25(1), 734-810. Esposito, M., Tse, T., & Soufani, K. (2018). Introducing a circular economy: new thinking with new managerial and policy implications. California Management Review, 60(3), 5-19. Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular economy – A new sustainability paradigm? Journal of Cleaner Production, 143, 757–768.; Konietzko, J., Bocken, N. & Hultink, E.J. (2020). A Tool to Analyse, Ideate and Develop Circular Innovation Ecosystems. Sustainability, 12,417. Reike, D., Vermeulen, W. J., & Witjes, S. (2018). The circular economy: New or refurbished as CE 3.0?—Exploring controversies in the conceptualization of the		

circular economy through a focus on history and resource value retention options. *Resources, Conservation and Recycling*, 135, 246-264

Lacy, P., Long, J., & Spindler, W. (2020). *The circular economy handbook*. London: Palgrave Macmillan UK (only chapter 2).

Tura, N., Hanski, J., Ahola, T., Ståhle, M., Piiparinen, S., & Valkokari, P. (2019). Unlocking circular business: A framework of barriers and drivers. *Journal of Cleaner Production*, 212, 90-98.

Recommended readings:

Ali, S. M., Appolloni, A., Cavallaro, F., D'Adamo, I., Di Vaio, A., Ferella, F., ... & Zorpas, A. A. (2023). Development Goals towards Sustainability. *Sustainability*, 15(12), 9443.

Bears, Robert C. (2021): *Developing the Blue Economy*, Palgrave Macmillan (p. 7-32).

Charter, M., Sherry, J. and O'Connor, F. (2020). *Creating Business Opportunities from Waste Fishing Nets*. *Blue Circular Economy*. Available at: <https://bluecirculareconomy.eu/wp-content/uploads/2022/03/FINAL-V2-BCE-MASTER-CREATING-BUSINESS-OPPORTUNITIES-FROM-WASTE-FISHING-NETS-JULY-2020.pdf>.

De Angelis, R. (2018). *Business models in the circular economy: Concepts, examples and theory*. Springer (only chapters 1 and 3).

Di Vaio, A., Hassan, R., D'Amore, G., & Dello Strologo, A. (2022). Digital technologies for sustainable waste management on-board ships: an analysis of best practices from the cruise industry. *IEEE Transactions on Engineering Management*.

European Commission. (2020). *A new Circular Economy Action Plan For a cleaner and more competitive Europe*. Brussels: European Commission.

Geng, Y., Sarkis, J., & Bleischwitz, R. (2019). Globalize the circular economy. *Nature*, 565, 153-155.

Jakobsen, S., Lauvås, T., Quatraro, F., Rasmussen, E., & Steinmo, M. (2021). Introduction to the Research Handbook of Innovation for a Circular Economy. In *Research Handbook of Innovation for a Circular Economy*. Edward Elgar Publishing (pp. 2-11).

Jiansu Mao, Chunhui Li, Yuansheng Pei, Linyu Xu (2018): *Circular Economy and Sustainable Development Enterprises*, Springer (Chapter 11 & 13).

Naddeo, V., & Taherzadeh, M. J. (2021). Biomass valorization and bioenergy in the blue circular economy. *Biomass and Bioenergy*, 149.

Razmjooei, D., Alimohammadlou, M., Ranaei Kordshouli, H. A., & Askarifar, K. (2023). A bibliometric analysis of the literature on circular economy and sustainability in maritime studies. *Environment, Development and Sustainability*, 1-28.

Stahel, W. R. (2016). The circular economy. *Nature*, 531(7595), 435.

SBE206. Models for Environmental & Economic Systems

Course name: Models for Environmental and Economic Systems			
Course Code: SBE206			
Field(s)/area(s) of study: Economics, Management, Ecology			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Environmental and economic modelling is called bioeconomic modelling. It is a field that studies the interactions between biological and economic systems. Bioeconomic models can help students understand and manage complex phenomena such as fisheries, tidal energy, biodiversity, and ecosystem services. This course will present an understanding about how changes in the environment (i.e., growing population, crop changes, and overfishing exploitation), or the use of natural resources (i.e. solar radiation, tides, wind) can lead to an important impact on the economy. The use of information systems tools (integrated models) could reduce the impacts on the environment and on the economy and would help in the decision-making process for stakeholders and governments. The course will explore different models and approaching methodology to give advice for new policies working under a blue economy mindset.			

Course Content:

The course will be divided into two main blocks:

Block #1 (16 hours): theoretical part

This course introduces students to the basic concepts and methods of bioeconomic modelling, which combines mathematical and computational tools to analyse the dynamics of biological and socio-economic systems. The course covers both classical and state-of-the-art models in various domains, such as fisheries management, tidal energy generation, conservation biology, and environmental policy. The theoretical part will focus on the basic concepts and methods of environmental and economic modelling, such as:

Integrated modelling (IAM) and E3 modelling (Energy-Environment-Economy), which are used to assess the impact of political actions on climate change and sustainable development.

Green economic modelling (GEM), which is used to analyse possible development scenarios based on green resources and technologies.

Equilibrium modelling for environmental science, which is used to study the complex interactions between human and natural systems.

Block #2 (24 hours): This practical part is focused on examples and applications of modelling in various fields, such as:

- In the identification of vulnerable areas to the accumulation of pollutants in shallow water areas of coastal regions.
- Like supporting tools in the integrated management of water resources.
- On the determination of any dispersive process in the marine environment.
- Evaluating the impacts of climate and land use changes on water quality in basins and the adjacent coastal areas.
- Studying climate change effects on water quality and quantity and the evaluation of water related ecosystem services.
- In the analysis of wave and wind energy.

In this sense, the students will work in teams of 4-5 people, and under the supervision of the Lecturer a study case will be carried out.

Keywords: Bioeconomic Modelling, Integrated Modelling, Management.

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

Students who successfully complete this course will have a basic background in the development of analytic and computational bioeconomic models. Student will

- Know the differences between renewable, recyclable, and exhaustible resources and the conditions that could lead to extinction of renewable resources.
- Have knowledge on the use, option and vicarious use benefits provided by biological resources and the ecosystems that sustain them.
- Know the sources of and consequences of market failure and governance failure.
- Understand the difference between consumption and capital value and the causes and consequences of stock externalities.
- Understand the theory and practice of modelling the dynamics of natural populations.
- Have knowledge on different kinds of models and approaches: catchment models, hydrodynamical models, NPZ models, Lagrangian/Eulerian approaches.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Identify the problem and the correct tools that give them good outputs to ensure the achievement of the best solution to stakeholders and administrations inside a blue economy mindset.
- Analyse policies and mechanisms that facilitate sustainable use of the ocean/sea and maximise benefits and value creation for current and future generations.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

Communication Skills; Critical Thinking; Collaboration/Teamwork; Time Management

- To know the instruments and techniques for the assessment of impacts on the environment.
- To be skilled in the practical use of environmental and socio-economic analysis tools.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	8	2h (Total 16h)
Project	12	2h (Total 24h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Report	(1) 5000 words	50%
Presentation	(1) 20 minutes oral presentation	25%
Questions	(1) 10 minutes questions/defence of the work.	25%

Assessment Criteria:

Study materials/Course literature: (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature*).

The accurate bibliography will be decided by the lecturers. As example of an accurate bibliography we are showing:

1. Bassi A. M., Moving Towards Integrated Policy Formulation and Evaluation: The Green Economy Model, Environmental and Climate Technologies, 2015/16, doi: 10.1515/rtuect-2015-0009.

2. Beven K.J., Rainfall-runoff modelling: the primer. Wiley-Blackwell. ISBN 978-0-470-71459-1.
3. Bronstert A., 2004. Rainfall-runoff modelling for assessing impacts of climate and land-use change. Hydrol. Process.18, 567–570.
4. Costanza R., de Groot R., Braat L., Kubiszewski I., Fioramonti L., Sutton P., Farber S. and Grasso M., 2017. Twenty years of ecosystem services: How far have we come and how far do we still need to go? Ecosystem Services 28, part A, 1-16.
5. Francesconi W., Srinivasan R., Pérez-Miñana E., Willcock S.P. and Quintero M., 2016. Using the Soil and Water Assessment Tool (SWAT) to model ecosystem services: A systematic review. J. Hydrol. 535: 625-636.
6. Harfoot M., Tittensor D. P., Newbold T., McInerny G., Smith M. J., Scharlemann J. P. W., Integrated assessment models for ecologists: the present and the future, Global Ecology and Biogeography, 2014, Volume23, Issue2, Pages 124-143, <https://doi.org/10.1111/geb.12100>.
7. Harper, D., 1992. Eutrophication of Freshwaters: principles, problems and restoration. Book, Netherlands, Springer. Edition number 1, Pages VIII, 327. <https://doi.org/10.1007/978-94-011-3082-0>
8. Nedkov S., Campagne S., Borisova B., Krpec P., Prodanova H., Kokkoris I. P., Hristova D., Le Clec'h S., Santos-Martin F., Burkhard B., Bekri E. S., Stoycheva V., Bruzón A. G., Dimopoulos P., 2022. Modelling water regulation ecosystem services: A review in the context of ecosystem accounting. Ecosystem Services 56. <https://doi.org/10.1016/j.ecoser.2022.101458>
9. Pan, A., 2023. The Bioeconomic Model. In: Bioeconomy. Springer, Singapore, https://doi.org/10.1007/978-981-19-6164-9_3.
10. Zulian G., Stange E., Woods H., Carvalho L., Dick J., Andrews C., Baró F., Vizcaino P., Barton D.N., et al., 2018. Practical application of spatial ecosystem service models to aid decision support. Ecosystem Services 29, 465-480.

SBE207. Remote Sensing Data & Techniques

Course name: Remote Sensing Data and Techniques			
Course Code: SBE207			
Field/area of study: Data Science			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: In this era of widespread climate changes, it becomes crucial to monitor events occurring over land, oceans, and various atmospheric layers. Scientists universally acknowledge that remote sensing stands out as the most reliable and continuous method for collecting data on both physical and biological processes at local and global scales, spanning short and long-term durations. Satellite observations have found applications in diverse areas, such as monitoring land cover, estimating geophysical processes, and examining terrain features. Cutting-edge instruments, designed for high spatial and temporal resolutions, have been deployed to observe sea surface temperature and salinity. Radars mounted on aircraft or low Earth orbiting platforms consistently yield backscatter data, facilitating the computation of altimetry and wind information. All the gathered data are integrated with numerical models for validation, calibration, and forecasting of marine and atmospheric conditions.			

This course introduces Earth observing and monitoring systems that leverage various sensing technologies to present a real-time, global overview of our surroundings.

Course Content:

The primary objective is to offer a comprehensive overview of fundamental remote sensing techniques, the various sensors, and the available data products. Additionally, the course will cover the derivation of new parameters from the combination of different bands within the electromagnetic spectrum. Explorations into satellite orbits, aircraft sensing, ground-based sensing, and space debris, are also integral to the curriculum.

Beyond the theoretical foundation, this study unit incorporates hands-on sessions where participants will engage in downloading and processing acquired satellite data along with corresponding meta-information. Numerous case studies, emphasising crucial aspects related to the physical sciences, will be thoroughly examined.

Keywords: Remote Sensing, Satellite Observations, Climate Monitoring, Data Processing, Electromagnetic Spectrum

Programme Learning Outcomes (PLOs):

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Describe and discuss capabilities and limitations of active and passive sensors utilisation in remote sensing.
- Understand the radiometric, spatial, spectral, and temporal resolution of remote sensing data.
- List key platforms and sensors and their characteristics.
- Describe and discuss levels of processing in available data products.
- Discuss the importance of remote sensing data utilisation in various domains of industry and governance.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Acquire remote sensing data from public sources.
- Assess the acquired data suitability for analysis.
- Integrate satellite data with in-situ measurement.
- Utilise interpolation and clustering techniques for gaining new insights.
- Perform quantitative and qualitative assessment of clustering and interpolation results.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Present arguments for selecting appropriate data and processing techniques.
- Design and conduct remote sensing based research.
- Present and discuss results of remote sensing analysis.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	15	2h (Total 30h)
Practicals	5	2h (Total 10h)
Other (please specify)		
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	1,000 words	30%
Analysis Task	8h	70%

Assessment Criteria

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)

- Elachi, Charles and Van Zyle, Jakob (2006). Introduction to the Physics and Techniques of Remote Sensing. Wiley-Interscience.
- Lillesand, Thomas M. and Kiefer, Ralph W. and Chipman, Jonathan W. (2015). Remote Sensing and Image Interpretation. Wiley.
- Seelye, Martin (2004). An Introduction to Ocean Remote Sensing. Cambridge University Press.
- Robinson, Ian S. (2010). Discovering the Ocean from Space. Springer Published in association with Praxis Pub.

SBE208. Marine Spatial Planning (MSP) & Integrated Coastal Zone Management (ICZM)

Course name: Marine Spatial Planning (MSP) and Integrated Coastal Zone Management (ICZM)			
Course Code: SBE208			
Field(s)/area(s) of study: Geography, Policy, Social Sciences, Environmental sciences			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 85% Online 15%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course is intended to provide students with a sound understanding of the MSP, ICZM, relations between them and their contribution to Blue Economy development.			
The course will provide students with practical skills to manage within MSP framework interactions between social-economic and environmental uses at sea and coast and in the sea-land interface.			
Course Content:			

1. Introduction to ICZM/ MSP: origin and need for MSP and ICZM, MSP/ICZM legal foundations, MSP/ICZM theory, know-how, planning cycle, MSP institutional structures and responsibilities
2. Examples and comparative analysis of maritime spatial plans from various countries, key principles to be observed: precautionary principle, ecosystem-based approach.
3. Marine space: ecological, economic and social characteristics and their relevance for MSP and ICZM
4. Stakeholder engagement: stakeholders needs and requirements (stakeholder specificity), the role of stakeholders in each phase of the MSP cycle, attracting the general public to MSP and ICZM, examples and good practices of stakeholder integration from various countries
5. Cross-border and sea basin collaboration on MSP: case studies analysis
6. Marine sectors under MSP: requirements of different sectors with regard to marine space, new sea users (e.g. deep sea mining) MARIPARKS, multi-use and co-existence, conflicts between sectors, conflicts between sectors and nature protection.
7. MSP soft skills: interactions between scientists, policy makers and business representatives, communicating MSP, organizing MSP process, trust building, project planning, transparency and accountability, reporting MSP progress (for authorities, stakeholders and the general public), MSP monitoring and evaluating, blue justice as imperative of MSP, managing and resolving conflict of interest
8. Case studies

Keywords: Marine Spatial Planning, Coastal management, Conflicts, spatial and temporal planning, pressures, stakeholder engagement, future scenarios, adaptive and integrated management, precautionary principles, scoping.

Programme Learning Outcomes (PLOs): Please, delete those that do not fit with the course content.

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand the essence and the principles of MSP and ICZM, the legal foundations;
- Identify the situation when MSP and ICZM are useful management options;
- Understand limitations and possibilities offered by ICZM and MSP with regards to managing blue growth, nature conservation and blue justice;
- Have in-depth understanding of how each maritime sector operates under the ICZM and MSP umbrella and interacts in spatial terms with other sectors.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Analyse a MSP plan and ICZM strategy observing key MSP/ICZM principles and EU ambitions;
- Propose amendments to the existing plans;
- Gain skills to allocate sea space to given sectors and foster collaboration between different types of stakeholders (also sectors) as a part of MSP/ICZM process.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Resourceful skills for participation and motivation in the classroom and elsewhere.
- Social skills, learning to learn and working in groups.
- Critical thinking on the topic of marine natural capital and ecosystem services.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.).

Method	Number of sessions	Duration
Lectures	14	2h (Total 28h)
Fieldwork	2	3h (Total 6h)
Seminar	3	2h (Total 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case Study (take home)		25%
Oral and Written Exercises		50%
Presentation		25%

Assessment Criteria:

- Completion of an analysis of a plan
- Attendance and participation in class.
- Oral presentation of the work done, answering trainers questions

Bibliography:

Scientific papers

- Elisa Lähde, Mari Pohja-Mykrä, Johanna Schreck, Co-creation of socio-ecological systems knowledge to adopt an Ecosystem-based Approach and Land-Sea Interactions in maritime spatial planning. *Marine Policy*, Volume 163, 2024. ISSN 0308-597X. <https://doi.org/10.1016/j.marpol.2024.106079>
- Gutierrez, D., Calado, H., & García-Sanabria, J. (2023). A proposal for engagement in MPAs in areas beyond national jurisdiction: The case of Macaronesia. *Science of the Total Environment*, 854. <https://doi.org/10.1016/J.SCITOTENV.2022.158711>
- Charles N. Ehler, Two decades of progress in Marine Spatial Planning, *Marine Policy*, Volume 132, 2021, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2020.104134>.
- Catarina Frazão Santos, Tundi Agardy, Francisco Andrade, Larry B. Crowder, Charles N. Ehler, Michael K. Orbach, Major challenges in developing marine spatial planning, *Marine Policy*, Volume 132, 2021, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2018.08.032>.
- Quero García, P., García Sanabria, J., & Chica Ruiz, J. A. (2021). Marine renewable energy and maritime spatial planning in Spain: Main challenges and recommendations. *Marine Policy*, 127. <https://doi.org/10.1016/J.MARPOL.2021.104444>
- García-Onetti, J., Scherer, M. E. G., Asmus, M. L., García Sanabria, J., & Barragán, J. M. (2021). Integrating ecosystem services for the socio-ecological management of ports. *Ocean and Coastal Management*, 206. <https://doi.org/10.1016/J.OCECOAMAN.2021.105583>
- García-Sanabria, J., García-Onetti, J., Cordero Penín, V., de Andrés, M., Caravaca, C. M., Verón, E., & Pallero-Flores, C. (2021). Marine Spatial Planning cross-border cooperation in the 'European Macaronesia Ocean': A participatory approach. *Marine Policy*, 132. <https://doi.org/10.1016/J.MARPOL.2021.104671>
- Quero García, P., Chica Ruiz, J. A., & García Sanabria, J. (2020). Blue energy and marine spatial planning in Southern Europe. *Energy Policy*, 140. <https://doi.org/10.1016/J.ENPOL.2020.111421>
- Article/Review - MSP: a systematic literature review on its concepts, approaches, and tools (2004–2020). <https://link.springer.com/article/10.1007/s40152-023-00349-7>
- Michele Quesada-Silva, Alejandro Iglesias-Campos, Alexander Turra, Juan L. Suárez-de Vivero, Stakeholder Participation Assessment Framework (SPAF): A theory-based strategy to plan and evaluate marine spatial planning participatory processes, *Marine Policy*, Volume 108, 2019, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2019.103619>.
- Quero García, P., García Sanabria, J., & Chica Ruiz, J. A. (2019). The role of maritime spatial planning on the advance of blue energy in the European Union. *Marine Policy*, 99, 123-131. <https://doi.org/10.1016/J.MARPOL.2018.10.015>
- Catarina Frazão Santos, Michael Orbach, Helena Calado, Francisco Andrade, Challenges in implementing sustainable marine spatial planning: The new Portuguese legal framework case, *Marine Policy*, Volume 61, 2015, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2015.08.010>.

Ir. Cathy Plasman, Implementing marine spatial planning: A policy perspective, Marine Policy, Volume 32, Issue 5, 2008, ISSN 0308-597X, <https://doi.org/10.1016/j.marpol.2008.03.016>

Documents/Reports/projects/Websites of interest

High Seas Treaty for the high seas (2023) https://www.un.org/bbnj/sites/www.un.org.bbnj/files/draft_agreement_advanced_unedited_for_posting_v1.pdf

Quesada da Silva, Michele Hwedie, Kwadwo Osei, Iglesias-Campos, Alejandro, Begmatova, Madina, Khalil, Aya, (2021) MSPglobal - Compendium of existing and emerging cross-border and transboundary MSP practices. UNESCO-IOC , IOC Information Document;1395 Paris

Iglesias-Campos, Alejandro; Rubeck, Julia; Sanmiguel-Esteban, David; Schwarz, Guido; Ansong, Joseph Onwona; Isaksson, Ingela; Quesada da Silva, Michele; Smith, Joanna; Suárez de Vivero, Juan Luis; Varjopuro, Riku; Zhiwei, Zhang, (2021) MSPglobal: international guide on marine/maritime spatial planning. Intergovernmental Oceanographic Commission & European Commission, Paris <https://aquadocs.org/handle/1834/42405>

Zaucha Jacek, Gee Kira, (2019) Maritime Spatial Planning past, present, future, Palgrave Macmillan, Cham <https://link.springer.com/book/10.1007/978-3-319-98696-8>

Book – Open access: Maritime Spatial Planning (2019). <https://link.springer.com/book/10.1007/978-3-319-98696-8>

VASAB and HELCOM, (2016) Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area, (on line), https://www.helcom.fi/wp-content/uploads/2019/08/Guideline-for-the-implementation-of-ecosystem-based-approach-in-MSP-in-the-Baltic-Sea-area_June-2016.pdf

VASAB and HELCOM (2016) Guidelines on transboundary consultations, public participation and co-operation (on line) https://helcom.fi/wp-content/uploads/2019/08/Guidelines-on-transboundary-consultations-public-participation-and-co-operation_June-2016.pdf

Directive 2014/89/EU for maritime spatial planning: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0089>

Zaucha Jacek (2014) The Key to Governing the Fragile Baltic Sea. Maritime Spatial Planning in the Baltic Sea Region and Way Forward, VASAB Riga https://vasab.org/wp-content/uploads/2014/06/Book_J.Zaucha_governing.pdf

Emiliano Ramieri, Elisa Andreoli, Angiola Fanelli, Giovanni Artico, Roberto Bertaggia, Methodological Handbook on Maritime Spatial Planning in the Adriatic Sea, Final Report of SHAPE project, 14 February 2014

, <https://www.researchgate.net/publication/332380444> Methodological Handbook on Maritime Spatial Planning in the Adriatic Sea

Gee Kira, Kannen Andreas, Heinrichs Bernhard, (2011) Vision 2030 Towards the sustainable planning of Baltic Sea space. S. Pro, Berlin <https://maritime-spatial-planning.ec.europa.eu/media/12725>

VASAB and HELCOM, (2010) Baltic Sea Broad-Scale Maritime Spatial Planning (MSP) Principles (on-line) <https://helcom.fi/wp-content/uploads/2019/08/HELCOM-VASAB-MSP-Principles.pdf>

Schultz-Zehden Angela, Gee Kira, Scibior Katarzyna, (2008) HANDBOOK on Integrated Maritime Spatial Planning, S.Pro
Berlin, http://www.plancoast.eu/files/handbook_web.pdf

International projects/Websites of interest

Support to Maritime Spatial Planning European Directive:
<https://marine.copernicus.eu/services/use-cases/support-maritime-spatial-planning-european-directive>

Policy Brief - Maritime spatial planning and land-sea interactions.
<https://www.espon.eu/sites/default/files/attachments/Policy%20Brief%20MSP-LSI.pdf>

MarinePlan. <https://maritime-spatial-planning.ec.europa.eu/projects/marineplan>

Maritime Spatial Planning Global 2030. [MSPglobal – MSPGLOBAL2030](#)

World Bank MSP

Toolkit. <https://www.worldbank.org/en/programs/problue/publication/marine-spatial-planning-for-a-resilient-and-inclusive-blue-economy-toolkit>

UNESCO/IOC guidance on MSP - <https://www.ioc.unesco.org/en/guidance-marine-spatial-planning>

MSP MED project - <https://mspmmed.eu/>

EU MSP Platform - <https://maritime-spatial-planning.ec.europa.eu/>

EU Strategy for the Adriatic and the Ionian (EUSAIR) - <https://maritime-spatial-planning.ec.europa.eu/practices/eu-strategy-adriatic-and-ionic-region-eusair>

Sea Sketch DSS - <https://marineplanning.org/tools/software/seasketch/>

MUSES project on co-existence: <https://muses-project.com/>

SBE209. Introduction to Blue Industries

Course name: Introduction to Blue Industries			
Course Code: SBE209			
Field/area of study: Economics			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>The main purpose of the course is to familiarise students with the specifics of the most important sectors related to the blue economy, including the entities operating within these industries. In the course, students will learn about the operations and global and regional (including SEA-EU partners regions) trends in such sectors as: maritime transport, port activities, shipbuilding and repair, marine living resources (fishing and aquaculture), maritime and coastal tourism, marine non-living resources extraction, blue biotechnology, infrastructure and robotic, maritime renewable and ocean energy. The linkages between sectors and their impact on global and local economies and other sectors will also be discussed. Additionally, political and non-political determinants of blue industries development, taking into account the context of sustainable development, will be discussed.</p>			

Course Content:

1. Introduction to Blue Economy: Blue Economy concept and it's sectors
2. Maritime transport & seaports activity
3. Shipbuilding and maintenance
4. Fishing & aquaculture
5. Marine non-living resources extraction (crude petroleum and natural gas; other minerals)
6. Maritime and coastal tourism
7. Marine and ocean renewable energy
8. Other sectors related to the marine environment (blue biotechnology sector; desalination of seawater)
9. The Blue Economy and its integrative role in the new world economic system and its impact in development and inter-regional connectivity. Challenges and development

Keywords: blue economy, sea sectors, sustainability

Programme Learning Outcomes (PLOs): *Please, delete those that do not fit with the course content.*

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- analyse, identify and interpret the specifics of economy sectors and, also, the actors operating in them, from companies to states and their often-conflicting interests
- understand the relations between the sectors of the blue economy
- understands the impact of the blue economy sectors on the global, EU and regional economies

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- describe the key features of the blue economy sectors
- identify and assess the key factors influencing the functioning of the blue economy sectors
- use basic terminology specific to the blue economy sectors
- describe the impact of the sectors on the global and regional economy

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- team working - ability to work in a team to prepare a presentation
- ability to communicate orally and in writing on the description of the sectors of the blue economy
- critical thinking, allowing an independent assessment of the phenomena taking place in the blue economy sectors and of their socio-economic impact
- ability to study the literature on the subject

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Fieldwork Study visit/guest lecture by a representative from a	1	2h

selected maritime sector (alternatively)		
Lectures	10	2h (Total 20h)
Online learning	7	2h (Total 14h)
Oral presentation (by students)	2	2h (Total 4h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination (Written)	1h	70%
Presentation	20 min	30%
Assessment Criteria:		
70% - Results of written exam		
30% - Results of oral presentation prepared and presented by students		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i>		
K. Johnson, G. Dalton, I. Masters (Eds), Building Industries at Sea: 'Blue Growth' and the New Maritime Economy, River Publishers 2018.		
W. K. Talley, Port Economics, Routledge, London – New York 2009.		
EU Blue Economy Observatory	https://blue-economy-observatory.ec.europa.eu/index_en	
Industry reports on the current state of selected sectors of the blue economy.		

SBE210. Environmental Accounting

Course name: Environmental Accounting			
Course Code: SBE210			
Field(s)/area(s) of study: Biophysical Accounting, Economic Accounting			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>The course aims to provide theoretical and applied skills required to use environmental accounting tools useful to reach sustainability goals, with particular reference to human activities in marine ecosystems.</p> <p>Environmental accounting is an important tool for understanding the role played by the natural environment in the economy. Environmental accounting focuses on assessing the supply of natural resources at corporate level or at the level of a national economy, both in biophysical and economic terms. It also provides financial and non-financial information related to environmental aspects, helping organisations manage their impact on the planet and make more sustainable business decisions.</p> <p>The environmental performance of human activities will be explored through biophysical accounting methods assessing different variables, among which</p>			

fossil fuels, mass, water, energy, and energy demands for the production of goods and services.

In addition, environmental cost accounting will be employed to identify, monitor, and analyse the costs associated with economic activities resulting from their impact on the natural environment.

Course Content:

Elements of General Systems Theory and systems diagramming. Energetics and lifestyles. Hubbert curve and peak oil. Anthropogenic pressure and Sustainable Development Goals (SDGs). Environmental footprints. Environmental Management Systems and related ISO norms. Environmental audit.

1. Tools of biophysical environmental accounting:

- Gross Energy Requirement
- Material flow accounting
- Ecological footprint
- Energy accounting

2. Tools of economic environmental accounting:

- Environmental cost accounting process
- Environmental metrics and indicators
- Impact of the investment on the environment

Case studies dealing with marine ecosystems.

Keywords: Natural resources, environmental footprints, environmental sustainability.

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- Understand the importance of natural resources in support of human economy
- Relate natural resources use and human activities
- Understand the dependence of human society on fossil resources
- Understand theories and tools of environmental accounting

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Speak and communicate in scientific and socially accessible language about environmental accounting.
- Apply different environmental accounting tools.
- Count metrics and indicators of environmental costs.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Digital skills for the use of general and specific tools.
- Critical thinking on the topic of environmental accounting and sustainable development.
- Skills in assessing the relationships between human activities and the biosphere.
- Link ecological and economic dynamics through an integrated perspective.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	10	2h (Total 20h)
Practical Study-unit	5	2h (Total 10h)
Project	2	2h (Total 4h)
Seminar	3	2h (Total 6h)
Total teaching contact hours:	40h	

Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral Examination		60%
Project		40%
Assessment Criteria: <ul style="list-style-type: none">• Completion of an oral exam with the theoretical contents.• Development of a project on environmental accounting.• Presentation of project reports by students.• Attendance and participation in classes, seminars, and lab sessions.		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> <ul style="list-style-type: none">- Selected scientific articles and reports.- Textbook to be decided.		

SBE211. Foundations of Finance

Course name: Foundations of Finance			
Course Code: SBE211			
Field(s)/area(s) of study: Social science (Economy/Finance)			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>The aim of this course is to introduce students to the concept of time value of money and to apply knowledge on finance in the context on climate change and environmental protection. The course will cover a wide range of finance products and services, in retail and corporate banking, its main instruments and the role of different financial institutions such as central banks, retail and commercial banks, credit unions, investment banks and companies, brokerage firms. The course will provide an overview of basic regulations and international market frameworks focus not only on ESG (Environmental, Social, Governance) goals but also on sustainability risk. It enables students to use acquired knowledge to solve dilemmas appearing in professional work. Students will be able to solve the basic problems in the field of finance appearing in business practice.</p>			

Course Content:

1. The time value of money
2. The economic-financial structure of the company and the evaluation of investments
3. Determination of the variables of an investment-financing project
4. The financial system and financial sources
5. Internal financial sources and their cost
6. Banking and Non-banking financial sources and their cost
7. The economic and financial feasibility of an investment Project
8. Environmental Social and Governance Criteria and sustainability risk

Keywords: Sustainable finance, investment, financial system

Programme Learning Outcomes (PLOs)

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *know the sources of finance*
- *understand the financial system*
- *Understand the variables critical for an optimal capital structure.*
- *have knowledge of Environmental Social and Governance Criteria*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *estimate time value of money*
- *evaluate various types of investments*

- assess the risk of the project
- prepare economic and feasibility of investment project

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

1. distinguish the characteristics of financial markets
2. recognize the characteristics of financial instruments
3. explain and apply the basic concepts of the time value of money
4. evaluate financial instruments
5. differentiate methods for evaluating investment projects
6. evaluate the profitability of the investment projects using different methods
7. recognize the Environmental Social and Governance Criteria
8. understand and implement skills and attitudes necessary for a green and sustainable economy

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	5,6,7	5 hours per unit (15 hours)
	1,2,3,4,8	2 hours per unit (10 hours)
Practical Study-unit	1,2,3,4,8	3 hours per unit (15 hours)
Total teaching contact hours:	40h	
Self - study time	85h. Distributed as follows:	
	Independent Study: Individual - students have short homeworks (points 1,2,3,4,8) to prepare by themselves after the practical study units. 40 hours totally (8 hours per session)	
	Project. Group work -connects points 1-8 - students prepare a project that is the result of the whole studies. 45h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	1-8	60%
Project and presentation of the project	1-8	40%
Assessment Criteria: The examination regulations should correspond with the intended learning outcomes. They should be applied consistently among partner universities. 1. Group project of 3-4 people, presentation in groups (40% of the final grade) 2. Final exam - test and open questions (60% of the final grade)		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> Basic literature: 1. Principles of Corporate Finance by Richard A. Brealey, Stewart C. Myers, and Franklin Allen 2. Corporate Finance by Stephen A. Ross, Randolph W. Westerfield, and Jeffrey Jaffe Additional literature: 1. Foundation of Finance, Keown Artur, Financial Times Prentice Hall, 2016 2. Principles of Sustainable Finance, Schoenmaker D., Schramade W., Oxford University Press, 2018		

SBE212. Sustainability Reporting

Course name: Sustainability Reporting			
Course Code: SBE212			
Field(s)/area(s) of study: Sustainability Reporting			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The new Corporate Sustainability Reporting Directive of the European Commission will oblige European companies to report their Environmental, Social, and Governance (ESG) performance to investors, customers, business partners & regulators. Moreover, sustainability reporting is a listing requirement on many international stock exchanges. Companies in the Blue Economy sector often have a significant impact on both the environment and the community in which they operate. This course guides the student to have a clear understanding of what is required and how to go about producing a report in line with an international sustainability reporting framework and its guidelines.			
Course Content: - Comprehend the relevance of corporate financial reporting to capital markets both under voluntary and mandatory practices;			

- Understand the various international standard-setters and frameworks (GRI, SASB, ESRS, ISSB, CDP) in the area of sustainability reporting in relation to EU regulations and the Blue Economy;
- Standards for preparing sustainability information, along with KPI use and the process of producing sustainability reports;
- Describe the main elements that make up the standards of the Global Reporting Initiative (GRI) and their implications for the process of producing sustainability reports, including challenges and obstacles in using the GRI standards;
- Recognise international stock exchange best practices and ESG reporting guidelines;
- Evaluate the main accounting implications derived from the latest regulatory developments for companies;
- Case studies of best practices of sustainability reporting.

Keywords: accounting regulation; Blue Economy; ESG disclosure; non-financial information; sustainability reporting

Programme Learning Outcomes (PLOs):

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- Explain the role of sustainability accounting and accountability.
- Describe the different reporting frameworks, both voluntary and mandatory, that companies use to report sustainability information, with particular focus on the Blue Economy.
- Know the evolution and current status of regulatory practices and requirements in the field of sustainability reporting at the European and international level.
- Acquire knowledge regarding concepts such as materiality, risk evaluation, indicators and stakeholders.
- Understand how to synthesise and communicate information and assessments on organisations' sustainability information.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Acquire a good mastery of the lexicon related to the topics.
- Understand the relevant regulatory sources and the main standards for reporting sustainability information.
- Know international best practices in the field of sustainability reporting.
- Interpret sustainability information using several international reporting frameworks.
- Identify data types, indicators, quality & responsibilities in order to collect and select adequate data regarding organisations' operations in order to create and maintain databases for reporting purposes.
- Co-produce and co-create instruments, tools and materials required to undertake sustainability reporting practices.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Develop the capability to critically evaluate strategies and tools organizations adopt to implement and report on sustainability and ESG.
- Develop the ability to make a critical and self-critical evaluation to collect and report sustainability information according to the requirements of a (mandatory or voluntary) reporting framework.

- Develop hypotheses and judgement regarding the effectiveness of the process of reporting sustainability information.
- Acquire the ability to holistically analyse the context in which organisations operate.
- Develop a commitment to transparency and accountability on the part of organisations and other relevant actors in the context of sustainable development.
- Understand Greenwashing/Greenhushing vs. reporting and communication

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

These results will be achieved through the following teaching methods: traditional class lectures, highly interactive lectures and group discussions, analysis of real case studies, and presentations by students on theoretical and practical topics. During the lectures, additional materials will be released (according with the evolution of laws and frameworks) and these materials could be used to prepare individual essays or applications.

Method	Number of sessions	Duration
Lectures	5	1h (Total 5h)
Seminar	8	2h (Total 16h)
Group Learning	5	1h (Total 5h)
Workshops	7	2h (Total 14h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods:

- Group presentation (30%): Case studies will be assigned during the semester to be completed and presented in class. The case studies measure the student's ability to search for the relevant economic information that applies to a specific business problem, stimulate them to analyse the problem, and provide managerial recommendations to address it. Presentations in class allow the discussion of the solutions suggested in an interactive way.
- Individual written essay (30%) students are required to write a critical essay (max 2,500 words excluding references and appendices) discussing one topic from a choice of three. These in-course assignments are intended to gauge

the students' ability to search for and present relevant information that applies to a specific sustainability problem and stimulate them to deal with complexity.

- Final exam (40%): The final exam is a combination of problems and essay questions. The aim of the final exam is to assess students' knowledge and understanding (interconnections) of the material covered throughout the course.

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Essay	Max 2,500 words excluding references and appendices	30%
Presentation	30 min.	30%
Final written exam	1h	40%

Assessment Criteria:

- Group presentation: Each group should prepare a two page summary of their presentation, to be given to class members. PowerPoint is the suggested presentation tool, although presenters are welcome to explore other props/possibilities. A 'group work rubric' will be provided to students at the very start of the semester. The presentation and report will be assessed collectively on the set of criteria (e.g. stage presence, content/relevance, creativity, collaboration, time, etc) indicated in the group work rubric.
- Individual written essay: The manuscript should be submitted in hard copy and by email (as attachment) two weeks before the exam date. The work will be evaluated taking into account the following parameters: completeness, clarity and critical analysis.
- The final exam will consist of 10 multiple-choice questions (for 20 points total) and two open questions (for 10 points total), and it will be dedicated to testing the theoretical knowledge acquired. In relation to the open questions, answers should include clear indications of the following elements: Framing and definition (student should know the definition of the concepts required and their implications); Content; Practical example (student should give an example to demonstrate his/her understanding of the definition). Points are awarded based on the number of correct elements included in the open answer according to this score distribution: Framing and definition, max. 2 point; Content, max. 2 point; Example max. 1 point.

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Gbangbola, K., & Lawler, N. (2020). Gold Standard Sustainability Reporting (2nd ed.). Taylor and Francis.

Laine, M.; Unerman, J.; Tregidga, H. (2022) Sustainability accounting and accountability, 3rd Edition, Routledge.

Bebbington, J.; Larrinaga, C.; O'Dwyer, B.; Thomson, I. (2021) Routledge Handbook of Environmental Accounting, Routledge.

Adams, C.A. (2022) Handbook of Accounting and Sustainability, Edward Elgar.

Y3. Expertise Module (60 ECTS). *Charting the Course*

Pathway 1. Blue Sustainability Accounting, Management and Planning (UPN/UG)

SBE311-P1 Landscape Planning & Management

Course name: Landscape Planning and Management			
Course Code: SBE311-P1			
Field(s)/area(s) of study: Landscape planning and management			
University coordinating the course: Parthenope University of Naples			
Participating universities: University of Gdansk			
Total ECTS:	5 ECTS	Language instruction:	of English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The goal of this course is to provide students with an opportunity to gain knowledge in the theory and methods of landscape planning and management, with a particular attention to marine and coastal areas. The course covers the analysis, planning, design, and management of landscapes to maintain or improve ecological sustainability. Basic knowledge tools will be provided to develop and manage landscape amongst competing land and sea uses while protecting natural processes and significant cultural and natural resources.			

Course Content:

1. Concepts in landscape planning and management: framework, legislation and policy documents (4 hours).
2. Basic elements of landscape: landscape perceptions and values. (2 hours).
3. Climate and other environmental factors in landscape (2 hours).
4. Natural and cultural heritages in delineation and characterization of the landscape (2 hours)
5. Landscape planning: goals, processes, and analytical methods (4 hours).
6. Marine and coastal landscape: specificity, characterization, and ecological aspects (4 hours).
7. Landscape construction materials and elements in marine and coastal areas: typology of humanized landscape (housing, ports, roads, etc.) (4 hours).
8. Landscape Evaluation Techniques and their contextualization in marine and coastal areas (4 hours).
9. The Site Plan: Landscape Mapping using Geographic Information System tools; scale, circulation, building lines, land uses, etc. (4 hours),
10. Management of Landscape and its environmental Impacts (4 hours).
11. Case study and applications: use of GIS (Geographic Information System) tools, maps and remotely sensed images for landscape planning and management (6 hours).

Keywords: Marine and coastal landscape; natural and humanised landscape; natural and cultural heritages; landscape plan.

Programme Learning Outcomes (PLOs):

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

Level: The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualifications framework(s);

Disciplinary field: The intended learning outcomes should comprise knowledge, skills, and competencies in the respective disciplinary field(s);
Achievement: The programme should be able to demonstrate that the intended learning outcomes are achieved.

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Identify landscape components;
- Analyse specificity, characterization, and ecological aspects of Marine and coastal landscape;
- Contextualize evaluation techniques in marine and coastal areas;
- Evaluate natural and cultural heritages;
- Prepare and manage a landscape plan using GIS.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Digital skills for the use of general and specific tools for landscape mapping;
- Digital skills for the use of general and specific tools for landscape analysis;
- GIS skills for landscape mapping;
- GIS skills for landscape planning;
- Bibliography and resources search skills;

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Adaptation and integration of their knowledge (techniques, scientific foundations, proposals, etc.) in any context, both research and professional, from a multidisciplinary perspective;
- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form;
- Develop autonomy and self-capacity to assume leadership and teamwork functions, especially in inter or multidisciplinary environments;
- Carry out continuous learning, developing, especially, organisational and planning skills.

- Apply their skills in professional activities related to different fields of blue economy, involving social and professional environment aspects at various scales (from the local, regional to the international);
- Develop autonomy and self-capacity to interact with different actors in different frameworks (consultancies, centres of research, public administrations, non-governmental organisations, companies).

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lectures	13	2h x 13 = Total 26h
Lab sessions	3	2h x 3 = 6h
Seminar	4	2h x 4 = 8h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	50%
Project	8h	50%

Assessment Criteria:

- Attendance and participation in class;
- Project Report;
- Project Presentation.
- Oral Exercises.

Study materials/Course literatura (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literatura, etc.*)

Tress, B., Tres, G., Fry, G., & Opdam, P. (Eds.). (2005). *From landscape research to landscape planning: Aspects of integration, education and application* (Vol. 12). Springer Science & Business Media.

Anh Tuan Nguyen (2010), GIS-Based Sustainable Landscape Planning and Management: Theory, Case Studies, Methodology, and Pilot Project, VDM Verlag Dr. Müller (October 5, 2010).

Martín, R., & Yepes, V. (2019). The concept of landscape within marinas: Basis for consideration in the management. *Ocean & Coastal Management*, 179, 104815.

Web resources:

Council of Europe Landscape Convention, <https://www.coe.int/en/web/landscape>

Mapping the marine landscape, <https://maritime-spatial-planning.ec.europa.eu/practices/mapping-marine-landscape>

Articles:

Qiu, W., & Jones, P. J. (2013). The emerging policy landscape for marine spatial planning in Europe. *Marine Policy*, 39, 182-190.

Rookwood, P. (1995). Landscape planning for biodiversity. *Landscape and Urban Planning*, 31(1-3), 379-385.

SBE312-P1 Life Cycle Assessment

Course name: Life Cycle Assessment			
Course Code: SBE312-P1			
Field(s)/area(s) of study: Environmental impact assessment			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims at providing students with concepts, definitions and methodologies to assess through a life cycle perspective the impacts generated by human activities on ecosystems and human health. Students become aware of the interdependency between the chains for producing goods and services and the generated environmental impacts.			
Course Content:			
1. Introduction			
a) Introduction to environmental sustainability.			
b) Main environmental problems (e.g. climate change, ocean acidification, eutrophication, ozone depletion).			
2. LCA methodology			

- a) Definition of the Life Cycle Assessment (LCA) methodology.
- b) Goal and scope definition. Choice of boundaries: physical, geographical, temporal. Impact categories. Data quality.
- c) Inventory of mass and energy flows.
- d) Environmental impacts assessment. Interpretation of results.
- e) The allocation of environmental impacts to products and co-products: mass allocation, energy allocation, economic allocation. System expansion and avoided allocation.

3. LCA application

- a) LCA and circular economy.
- b) LCA and food chains.
- c) LCA and waste.
- d) LCA and energy systems.

e) The 2030 Agenda, SDGs and the role of LCA.

4. LCA in the context of methodologies for assessing and selecting the optimal technological alternative from a sustainability perspective (e.g., Environmental Impact Assessment, Environmental Risk Assessment; Ecological footprint; Multi-Criteria Decision Making; Eco-design).

5. LCA software and database

- a) Open source and commercial LCA software.
- b) Commercial and free database.

Keywords: Environmental impact, environmental accounting, sustainability, case studies.

Programme Learning Outcomes (PLOs):

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

Level: The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualifications framework(s);

Disciplinary field: The intended learning outcomes should comprise knowledge, skills, and competencies in the respective disciplinary field(s);

Achievement: The programme should be able to demonstrate that the intended learning outcomes are achieved.

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand the typologies of environmental problems and impact categories.
- Relate human activities and environmental impacts.
- Acknowledge the influence and impacts of humans on natural ecosystems and processes.
- Acknowledge the influence and impacts of blue industries on natural ecosystems.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Relate human activities and environmental impacts.
- Identify main environmental problems and impact categories.
- Assess environmental impacts by using a life cycle perspective.
- Use life cycle assessment tools (software and database).
- Understand the uncertainties and limitations of LCA.
- Use computer skills to work with life cycle assessment.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to perform:

- Digital skills for the use of general and specific tools.
- Skills in assessing environmental performance.
- Social skills, learning to learn and working in groups.
- Critical thinking on the topic of resource use and environmental impact.

Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)		
Method	Number of sessions	Duration
Lectures	12	2h (total 24h)
Project	4	2h (total 8h)
Seminar	4	2h (total 8h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	50%
Project	8h	40%
Participation in seminars	8h	10%
Assessment Criteria		
<ul style="list-style-type: none">• Completion of an oral exam about the theoretical contents.• Development of a project on life cycle assessment.• Presentation of project reports by students. Attendance and participation in classes, seminars, and lab sessions.		
Study materials/Course literature (<i>hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature,</i>).		
European Commission - Joint Research Centre - Institute for Environment and Sustainability: <i>International Reference Life Cycle Data System (ILCD) Handbook - General guide for Life Cycle Assessment - Detailed guidance</i> . First edition March 2010. EUR 24708 EN. Luxembourg. Publications Office of the European Union; 2010		
Selected scientific articles on case studies and reports.		

SBE313-P1 Environmental Monitoring

Course name: Environmental Monitoring			
Course Code: SBE313-P1			
Field(s)/area(s) of study: Environmental Monitoring, Characterization and Impact assessment			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course delves into the study of pollution phenomena, environmental characterization and monitoring with advanced methodologies and technologies, including remote, proximal, and in-situ sensing technologies and with IT tools dedicated to data management, analysis and reporting. The content of course is designed to elevate environmental situational awareness, aligning with established environmental models (source-path-target), and providing insights into the complex dynamics of pollution phenomena. The course contributes to develop proficiency in environmental impact assessment methodologies and nurture essential skills to address contemporary environmental challenges. This course integrates theoretical concepts with practical applications, preparing students to make significant contributions to environmental sustainability and conservation efforts.			

Course Content:

.- Introduction to Environmental Monitoring

Understanding environmental systems and pollution phenomena

Importance of characterization and monitoring for the environmental situational awareness

.- Principles of Environmental Monitoring

Historical overview, definitions, and campaign strategies

Models for analysing environmental phenomena

.- Environmental Assessments

Environmental impact studies and case analysis

Hands-on experimental activities

.- Monitoring Techniques and Technologies

Tools and methods for environmental monitoring

Surveying techniques and data analysis

Advanced methods for detecting environmental contamination, integrating in-situ analysis with remote/proximal sensing techniques into a unique multilayer synoptic representation

.- Drafting Monitoring Projects

Document analysis and selection of monitoring parameters

Engagement with regulatory bodies

.- Thematic Insights and Seminars

- Environmental Forensics
- Advanced sensing technologies using satellite/aircraft/drones
- Bio-tracking, bio-monitoring, and bio-magnification based on specific bio-indicators

The course may incorporate examples and case studies focusing on the monitoring of marine and coastal areas, providing detailed insights into the unique characteristics and critical challenges.

Keywords: Environmental Monitoring, Environmental Characterization, Environmental Impact Assessment, Environmental Situational Awareness, Advanced Sensing Methods and Technologies

Programme Learning Outcomes (PLOs):

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- enhances understanding of environmental monitoring, characterization and impact assessment, emphasising comprehension of complex environmental systems
- apply advanced monitoring/sensing techniques, and design effective monitoring projects.
- enhances understanding of contemporary environmental challenges and solutions
- elevate environmental situational awareness

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- use advanced methodologies and technologies for environmental monitoring and characterization
- apply remote, proximal, and in-situ sensing techniques for environmental monitoring
- use IT tools for data management, analysis, and reporting in environmental studies
- enhance environmental situational awareness aligned with established models like source-path-target
- Understand complex dynamics of pollution phenomena to address contemporary environmental challenges
- Integrate theoretical concepts with practical applications to contribute meaningfully to environmental sustainability and conservation efforts

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

Skills in linguistic communication both for the university environment and for society.

- Digital skills for the use of general and specific tools.
- Resourceful skills for participation and motivation in the classroom and elsewhere.
- Social skills, learning to learn and working in groups.
- Critical thinking on the topic of environmental monitoring, characterization and situational awareness.
- Skills in assessing human impact on natural processes, ecosystems and, more in general, on the dynamic of pollution phenomena.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	13	2h (total 26h)
Oral presentation/Project	4	2h (total 8h)
Seminar	3	2h (total 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	60%
Project	8h	40%

Assessment Criteria:

- Completion of an oral exam with the theoretical contents.
- Development of a project.
- Presentation of project reports.

Attendance and participation in classes, seminars, and lab sessions.

Study materials/Course literature:

Textbook: Monitoring Biodiversity Combining Environmental and Social Data, by Anna Allard, E. Carina H. Keskitalo, Alan Brown (2023), Routledge, Open Access, available at: <https://library.oapen.org/bitstream/id/83ccc85c-0a34-45bc-89dd-d07505a56688/9781000840636.pdf>

Selected scientific articles and reports.

SBE314-P1. Ocean Ecology & Accounting

Course name: Ocean Ecology & Accounting			
Course Code: SBE314-P1			
Field(s)/area(s) of study: Ocean Ecology, Ecosystem accounting.			
University coordinating the course: Parthenope University of Naples			
Participating universities: University of Gdansk			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course integrates marine ecology and ecosystem accounting for studying and managing the ocean as a complex adaptive system. Marine ecosystem accounting aims to analyse the interrelationship between economy, society and environment, how social and economic factors affect the value of ecosystem goods and services, and vice versa. The course provides students with the basis for the interpretation and application of ocean accounting approaches and tools.			
Course Content: Introduction. The Anthropocene ocean. The Great Acceleration. Ecology of the Anthropocene.			

Oceans - source of life. Ocean biodiversity and marine resources. Ocean ecology under climate change.

Human activities and impacts on the oceans. Sustainable use of the oceans.

Ocean accounting for sustainable development. Initiatives to measure and assess the ocean. The SEEA-EA framework.

The Ocean Accounts framework. Ocean assets. Ocean services. Flows to the environment.

The role of the ocean in the global carbon cycle.

Case studies on ocean ecosystem accounting.

Tools and databases for ocean accounting.

Keywords: Ocean ecology, ocean accounts, sustainability.

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio- ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand the role of oceans in providing goods and services.
- Assess ocean assets and flows.
- Acknowledge the influence and impacts of humans on the ocean.
- Acknowledge the importance of the ocean in climate regulation.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Account for the value of ocean ecosystems goods and services.
- Use ecosystem accounting tools.
- Communicate the role of the ocean in supporting human economy.
- Understand uncertainties and limitations of ocean accounting tools.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to perform:

- Digital skills for the use of general and specific tools.
- Skills in ocean ecosystem accounting.
- Critical thinking on the topic of marine resource use and environmental impact.
- Social skills, learning to learn and work in groups.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*).

Method	Number of sessions	Duration
Lectures	12	2h (total 24h)
Project	4	2h (total 8h)
Seminar	4	2h (total 8h)

Total teaching contact hours:

40h

Self - study time

85h

Total Learning hours

125h

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	60%
Project	8h	40%

Assessment Criteria:

- Completion of an oral exam with the theoretical contents.

- Development of a project on ocean accounting.
- Presentation of project reports.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)*

Duffy J.E., 2021. Ocean Ecology. Marine life in the age of humans. Princeton University Press.

Selected scientific articles and reports on ocean accounting.

SBE315-P1. Aquaculture & Food Security

Course name: Aquaculture & Food security			
Course Code: SBE315-P1			
Field(s)/area(s) of study: Agri-food system			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course will present an introduction to the global seafood system which includes three interconnected sectors: commercial capture (or wild-caught) fisheries, recreational and subsistence fisheries, and aquaculture (or farmed seafood). It will focus on the importance of Food Security in the present and future scenario and the role of aquaculture. The course will provide first of all the basis of the Food Security issue also from a sustainable perspective and then will focus on the contribution of aquaculture to Food security. To this end the course will include the analysis of the present and future scenario of fish supply and demand and of the international regulation for aquaculture.			
Course Content:			
1. Introduction to Food security. Definitions, general concept, future scenario.			
2. Food security and Agenda 2030. Analysis of the related goals			

3. **The contribution of aquaculture to food security objectives.** Analysis of main concern about future fish consumption based on expected population growth as well as due to the large number of people still suffering from undernourishment.
4. **Fish supply and demand to 2030.** Relevance of the economic impact of changes in supply and demand, for example, due to changes in food prices, household income, and consumer preferences.
5. **Different scenarios for future aquaculture production.** Limits to the potential expansion of production from fisheries and aquaculture.
6. **International regulation for aquaculture.** Current status of the international regulation.

Keywords: Aquaculture, production growth, food security.

Programme Learning Outcomes (PLOs)

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- To understand the meaning and relevance/implications of Food security
- To acquire knowledge of the importance of Food Security in the Agenda 2030
- To recognize the contribution of aquaculture to food security objectives.
- To discuss different scenarios for future aquaculture production.
- To acquire knowledge on the International regulation for aquaculture.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Field work skills
- Bibliography and resources search skills
- Organisational and Problem-solving
- Oral and writing communication skills
- Assertiveness, reasoning, and critical thinking skills

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Develop sensitivity towards environmental and social problems relating to Food security
- Develop sensitivity towards economic, environmental and social problems relating to aquaculture
- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form.
- Develop autonomy and self-capacity to carry out continuous learning, developing, especially, organisational and planning skills.
- Assume leadership and teamwork functions, especially in inter or multidisciplinary environments, developing skills for interpersonal relationships.
- Develop an innovative spirit, fostering knowledge of the most innovative and recent aspects in the evolution of the discipline, practices in the development of projects, as well as the promotion of their creativity.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Fieldwork	2	2 x 5h = 10 h
Lectures	8	9 x 2h = 18 h
Oral presentation	3	3 x 2 h = 6 h
Seminar	3	3 x 2 h = 6 h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	30%
Project	2h	70 %
Assessment Criteria: Attendance and participation in class. <ul style="list-style-type: none"> Oral Presentation an examination Originality of the project 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...).</i> Einarsson, Á., & Óladóttir, Á. D. (2020). Fisheries and Aquaculture: The Food Security of the Future. Academic Press (the assigned chapters will be communicated at the beginning of the course) Bjørndal, T., Dey, M., & Tusvik, A. (2024). Economic analysis of the contributions of aquaculture to future food security. <i>Aquaculture</i> , 578, 740071. Béné, C., Arthur, R., Norbury, H., Allison, E. H., Beveridge, M., Bush, S., ... & Williams, M. (2016). Contribution of fisheries and aquaculture to food security and poverty reduction: assessing the current evidence. <i>World development</i> , 79, 177-196. Kent, G. (1995, April). Aquaculture and food security. In Proceedings of the PACON Conference on Sustainable Aquaculture (Vol. 95, pp. 11-14). A.L. Cojocar, Y. Liu, M.D. Smith, W. Akpalu, C. Chávez, M.M. Dey, N. Tran The "seafood" system: aquatic foods, food security, and the Global South Rev. Environ. Econ. Policy, 16 (2) (2022), pp. 306-326		

SBE316-P1. Sustainable & Climate Finance

Course name: Sustainable and Climate Finance			
Course Code: SBE316-P1			
Field(s)/area(s) of study: Finance			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Explore the intersection of finance and sustainability with our cutting-edge course on Climate and Sustainable Finance.			
Course Content: Climate change is one of the most urgent issues our planet faces, requiring significant financial investment to address. The financial sector plays a key role in supporting the transition to low-carbon and sustainable economies. This course introduces students to the latest topics in climate and sustainable finance, aiming to provide them with the knowledge and skills needed to understand and teach in these interconnected areas. Throughout the course, students will explore the basic science of climate change and the integration of climate and sustainability concepts into economic and financial theories. They will study asset pricing related to environmental factors, corporate carbon disclosure practices, and sustainable			

investment management. Additionally, the course covers the financial aspects of both corporations and households in the context of climate and sustainable finance, as well as the role of financial institutions in promoting sustainable practices. By the end of the course, students will have a comprehensive understanding of how the financial sector can drive sustainability and support efforts to combat climate change.

Keywords: Climate Finance, Sustainable Finance, Low-Carbon Economies.

Programme Learning Outcomes (PLOs):

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Describe alternative economic approaches in addition to traditional economic analysis.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Apply theoretical knowledge to analyse and solve real-world problems related to climate and sustainable finance.
- Develop practical financial strategies that facilitate the transition to low-carbon economies, utilising appropriate methodologies and tools.
- Communicate concepts and research findings effectively.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Apply theoretical knowledge to analyse and solve real-world problems related to climate and sustainable finance.
- Develop practical financial strategies that facilitate the transition to low-carbon economies, utilising appropriate methodologies and tools.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Exercise autonomy in developing and implementing financial solutions that address sustainability challenges, considering long-term economic, environmental, and social impacts.
- Take responsibility for ongoing professional development by staying current with the latest research and trends in the field, continuously reflecting on and improving personal learning and teaching practices.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	14	2h (total 28)
Oral presentation	1	2h (total 2h)
Lab sessions	2	2h (total 4h)
Seminar	3	2h (total= 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	20 minutes per student	60%
Project	20 minutes per student	40%

Assessment Criteria: Assessing the student's grasp of climate change science, sustainable finance principles, and financial theory related to low-carbon economies.

Study materials/Course literature: (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.*)

The Routledge handbook of green finance, Lehner, Othmar M., editor.; Harrer, Theresia, editor.; Silvola, Hanna, editor.; Weber, Olaf (Professor of finance), editor. 2024

Principles of Sustainable Finance, Schoenmaker D., Schramade W., Oxford University Press, 2018

SBE317-P1. Environmental & Urban Planning

Course name: Maritime Sustainable Supply Chains			
Course Code: SBE317-P1			
Field(s)/area(s) of study: Environmental and Urban Planning			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The goal of this course is to provide students with an opportunity to gain knowledge in the theory and methods of Environmental and Urban Planning, with particular attention to marine and coastal contexts. The course integrates different aspects of environmental sciences (natural, social, and economic) with planning principles. Basic concepts, theories and methods of planning and environmental sciences will be provided to develop the student's skills for a multidisciplinary approach.			
Course Content:			
Spatial planning: basic concepts; contemporary issues in spatial planning; the history and evolution of spatial planning; spatial planning as a process. (4 hours).			
Spatial planning in specific contexts: town planning, city planning, regional planning, rural planning (2 hours).			

Evolution of urban and regional spaces: the importance of cities to the economic, cultural, and political well-being of modern societies; impacts of industrialization, globalisation and urbanisation on structure and functions of cities (4 hours).

Sustainability for urban and regional development: theory and practise for urban and regional sustainability; understanding the relationship between human activities and environmental integrity. social, economic and environmental impacts (4 hours).

Urban planning: development and design of land use and the built environment; urban areas; the infrastructure passing into and out of urban areas: transportation, communications, and distribution networks, and their accessibility (4 hours).

Urban planning as an interdisciplinary science: land-use planning, zoning, economic development, environmental planning, and transportation planning (2 hours).

Environmental planning: basic concepts; multi-disciplinary aspects; use and development of land and water resources; development of sustainable communities and ecosystems; marine and coastal specificity (4 hours).

Environmental planning legislation and regulation: general principles and basic framework of environment policy in European Union; (2 hours).

Environmental issues: Wildlife and Biodiversity Planning, Open Space Planning, Stream Restoration, Stormwater Management, Recycling & Solid Waste Management Contaminated Brownfields Remediation and Redevelopment, Urban Reforestation, Wetlands Restoration (4 hours).

Environmental planning methods: methods used in environmental planning and management to create plans to solve environmental problems; Environmental Impact Assessment; operational analysis and tools; implementation of environmental planning methods in GIS (4 hours).

Case study and applications: use of GIS (Geographic Information System) tools, maps and remotely sensed images for environmental, regional and urban planning in coastal areas (6 hours).

Keywords: Environmental planning; regional planning; urban planning; marine and coastal environment; natural and humanised environment; GIS.

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Integrate different aspects of environmental sciences (natural, social and economic) with planning principles;
- Analyse specificity, characterization, and ecological aspects of Marine and coastal environment;
- Contextualise environmental, regional and urban planning techniques in marine and coastal areas;
- Coordinate an interdisciplinary planning team;
- Prepare and manage a landscape plan using GIS.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Use digital skills for general and specific tools for environmental planning;
- Use digital skills for the use of general and specific tools for regional planning;
- Use digital skills for the use of general and specific tools for urban planning
- Use GIS skills for environmental planning;
- Use GIS skills for regional planning;
- Use GIS skills for urban planning;
- Use Bibliography and resources search skills.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Adaptation and integration of their knowledge (techniques, scientific foundations, proposals, etc.) in any context, both research and professional, from a multidisciplinary perspective;

- Capacity to present and publicly defend information, ideas and arguments, in a clear and correct manner, regardless of the level of specialisation of the public, both in written and oral form;
- Develop autonomy and self-capacity to assume leadership and teamwork functions, especially in inter or multidisciplinary environments;
- Carry out continuous learning, developing, especially, organisational and planning skills.
- Apply their skills in professional activities related to different fields of blue economy, involving social and professional environment aspects at various scales (from the local, regional to the international);
- Develop autonomy and self-capacity to interact with different actors in different frameworks (consultancies, centres of research, public administrations, non-governmental organisations, companies).

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	13	2x13=26
Lab sessions	3	2x3=6
Seminar	4	4x2=8
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	50%
Project	8h	50%

Assessment Criteria:

Attendance and participation in class

- Project Report
- Project Presentation
- Oral Exercises

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)

Books:

Daniels, T. (2014). *The Environmental Planning Handbook for Sustainable Communities and Regions*.

Hall, P., & Tewdwr-Jones, M. (2019). *Urban and regional planning*. Routledge.

Kay, R., & Alder, J. (2017). *Coastal planning and management*. CRC Press.

WEB resources:

Council of Europe Conference of Ministers responsible for Spatial/Regional Planning (CEMAT), <https://www.coe.int/en/web/conference-ministers-spatial-planning/home>

EU Environmental Policies: A short history of the policy strategies, https://aei.pitt.edu/98675/1/enviro_n_policies...pdf

Article:

Yeh, A. G. (1999). *Urban planning and GIS. Geographical information systems*, 2(877-888), 1.

SBE318-P1. Maritime Sustainable Supply Chains

Course name: Maritime Sustainable Supply Chains			
Course Code: SBE318-P1			
Field(s)/area(s) of study: Maritime transport and sustainability			
University coordinating the course: Parthenope University of Naples			
Participating universities: University of Gdansk			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course aims at providing students with concepts, definitions and methodologies to assess key issues to improve the sustainability of supply chain strategies in ports. Students become aware of tools and frameworks to achieve air, water and soil quality preservations and to understand green port infrastructures with energy production.			
Course Content: RULES AND REGULATIONS (Adaptation guidelines to climate resilience ports, water framework directive on disposal of dredged materials) WATER, SOIL AND AIR QUALITY PRESERVATION (Environmental dredging, cold ironing)			

PORT INFRASTRUCTURE RESILIENCE (Engineering enhancement of sea defences considering changing wind, sea level and wave conditions)

GREEN PORT INFRASTRUCTURES WITH ENERGY PRODUCTION

Keywords: supply chain, sustainable ports, environmental impact, sustainability.

Programme Learning Outcomes (PLOs):

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

Understand the main tools and frameworks for designing, implementing and evaluating sustainable supply chains strategies in ports.

- Understand the typologies of green marine initiatives for ports.
- Understand key issues of guidelines to climate resilience ports.
- Identify the actions to be pursued for air, water and soil quality preservations in ports.
- Understand the modifications in wind, wave and water level actions on sea defences in order to evaluate the structural improvements to be made.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Speak and communicate in scientific and socially accessible language about Maritime Sustainable Supply Chains

- Ability to relate green actions and environmental quality improvement.
- Ability to identify main air, water and soil quality preservation.
- Ability to assess green port infrastructures initiatives.
- Be able to calculate wind, wave and water level actions on sea defences.
- Computer skills to work with structural improvements on sea defences.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

Skills in linguistic communication both for the university environment and for society.

- Digital skills for the use of general and specific tools.
- Resourceful skills for participation and motivation in the classroom and elsewhere.
- Social skills, learning to learn and working in groups.
- Critical thinking on the topic of air, water and soil quality related to ports.
- Skills in assessing structural improvements on sea defences.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	13	2h (total 26h)
Project	4	2h (total 8h)
Seminar	3	2h (total 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	60%

Project	8h	40%
Assessment Criteria: <ul style="list-style-type: none"> • Completion of an oral exam on theoretical contents. • Development of a project on impact of green port initiative and green energy production. • Presentation of project reports by students. Attendance and participation in classes, seminars, and lab sessions.		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.).</i> Textbook: Maritime Supply Chains, 2019, Thierry Vanellander, Christa Sys, Elsevier. https://www.sciencedirect.com/book/9780128184219/maritime-supply-chains Slides in pdf, selected scientific articles and reports.		

SBE319-P1 Operation Planning & Management

Course name: Operation Planning & Management			
Course Code: SBE319-P1			
Field(s)/area(s) of study: Corporate Finance, SECS-P/08			
University coordinating the course: Parthenope University of Naples			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course aims at providing students with operation planning and management knowledge, techniques, and tools. Students, while working in project teams, will gain a practical approach towards planning and managing business. They also develop a framework to Identify the different economic actors and stakeholder groups in ocean- based industries, analyse policies that facilitate sustainable use of marine ecosystems and maximise benefits and value creation for current and future generations.			
Course Content: I. Management II. Strategy III. Value chain IV. Business planning V. Operation and Marketing VI. Conclusions			

Keywords: Management, Strategy, Value chain, Business planning, Operation and Marketing

Programme Learning Outcomes (PLOs): Please, delete those that do not fit with the course content.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Identify the different economic actors and stakeholder groups in ocean-based industries.
- Identify policies that facilitate sustainable use of marine ecosystems.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Work in a team to maximise present and future value of the marine ecosystem.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Critical thinking on strategic management of marine ecosystems.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Fieldwork	4	2h (tot = 8h)
Lectures	4	2h (tot = 8h)
Oral presentation	4	2h (tot = 8h)

Lab sessions	4	2h (tot = 8h)
Seminar	4	2h (tot = 8h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination	2h	40%
Project	8h	60%
Assessment Criteria: <ul style="list-style-type: none">• Oral exam• Development and presentation of a project		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)</i> <ul style="list-style-type: none">• Operation and supply chain management Jacobs Chase• Contemporary strategy Analysis Robert Grant• Papers on the field		

Pathway 2. Conservation and Sustainable Use of Marine Resources (UG)

SBE321-P2. Protection of the Marine Environment

Course name: Protection of the Marine Environment			
Course Code: SBE321-P2			
Field(s)/area(s) of study: marine ecology, marine policy			
University coordinating the course: University of Gdańsk			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course offers an introduction to the protection of the marine environment.			
Course Content:			
The course will start with an overview of human impacts on marine ecosystems, followed by a discussion on the need of protecting oceans. Students will be then familiarized with the most important conventions, treaties and international agreements, as well as with the techniques commonly used for marine conservation. The course will introduce the concept of marine protected areas, focusing on their diversity, management and effectiveness assessment, but will also present other techniques, including resource management and social methods. International organizations and their role in the management of marine living resources will also be discussed, especially in			

the context of protecting open oceans and other vulnerable areas, like polar regions.

Keywords: human impacts on marine ecosystems, protection of the marine environment

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- characterize the basic life forms of biocenoses, demonstrate knowledge of the basic mechanisms of functioning of marine ecosystems
- to correctly assess the causes of anthropogenic threats to the functioning of marine ecosystems
- characterize human-induced changes in the marine environment at various time and space scales
- characterize methods for marine environment protection

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- formulate correct conclusions based on studies literature
- assess the effectiveness of methods for protecting marine environments

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

<ul style="list-style-type: none"> - present pro-ecological attitudes using theoretical and practical solutions 		
Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)		
Method	Number of sessions	Duration
Workshop	8	8 x 4 h = 32 h
Lectures	4	4 x 3 h = 12 h
Seminars	2	2 x 2 h = 4 h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125 h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	2h	60%
Presentation	2h	40%
Assessment Criteria: Attendance and participation in class. Oral Presentation. Written exercises.		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature) Salomon Markus, Till Markus, 2018. Handbook on Marine Environment Protection Science, Impacts and Sustainable Management, Springer International Publishing. Daud Hassan, Saiful Karim, 2018. International Marine Environmental Law and Policy, Taylor & Francis. Veronica Frank, 2007. The European Community and Marine Environmental Protection in the International Law of the Sea, Brill. Paul D. Goriup, 2017. Management of Marine Protected Areas, A Network Perspective, Wiley.		

SBE322-P2. Ecological Assessment of Aquatic Environments

Course name: Ecological assessment of aquatic environments			
Course Code: SBE322-P2			
Field(s)/area(s) of study: marine ecology, marine biology			
University coordinating the course: University of Gdańsk			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
To introduce students with different surveying and monitoring methods used in biological assessments of water environment. To enable critical scrutiny of use proper tools and methods in water environment monitoring and adequate interpretation of data.			
Course Content:			
Contents of lectures: the introduction to the principles of biological methods used in monitoring of marine environments, the technics and methods used in biological monitoring based on plant and animal communities and biomarkers, the best practices in the assessment of water environment status based on EU and Polish regulations.			
Contents of practicals: the preparation of project aiming to assess the water environment status in one of the regions of the Gulf of Gdansk, field trip/research cruise to learn and practise methods used for gaining various			

biological material for water monitoring, obtaining material for plant and animal communities analysis, discussion over the best practices, quantitative and qualitative analysis of plant and animal communities for the assessment of water environment status, the use of cytogenetic methods for the assessment of water environment - mussels case study, the analysis of data gathered for the assessment of water environment, the preparation and presentation of the report.

Keywords: monitoring of marine environments, assessment of water environment status

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *to characterize basic techniques, research methods and tools (mathematical, statistical, IT) used in monitoring to describe and interpret phenomena and processes occurring in the aquatic environments*
- *to characterize basic legal regulations and rules regarding the sustainable development of the aquatic environment as well as management of the marine environment and its resources*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *to plan tests and measurements in aquatic environments, using appropriately measurements and analytical techniques, adequately to the research problems*

- to formulate and solve basic problems concerning the functioning of particular components of the aquatic environments, integrating knowledge from various fields and disciplines

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- to be critical in receiving information from the scientific literature, the Internet and other media referring to the natural sciences

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	6x2h	12h
Workshops	6x3h	18h
Fieldwork	2x5h	10h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	2h	60%
Student project	2h	40%

Assessment Criteria:

Positive mark from a written examination

Student project, assessment of student activity during each step of the project, attendance

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Bellinger E.G., Sigee D.C., 2010, Freshwater algae: identification and use as bioindicators, Wiley-Blackwell, ISBN 978-0-470-05814-5

Greenberg B., Hull R.N., Roberts M.H., Gensemer R.W., 2001, Environmental Toxicology and Risk Assessment: Science, Policy, and

Markert B.A., Breure A.M., & Zechmeister Z.G., 2003, Bioindicators and Biomonitoring, Elsevier, ISBN 0080441777

Perry J., Vanderklein E., 2002, Water quality. Management of a Natural Resource, Blackwell Science, ISBN 0-86542-469-1, s. 639

SBE323-P2. Sustainable Fisheries Management

Course name: Sustainable Fisheries Management			
Course Code: SBE323-P2			
Field(s)/area(s) of study: ecology of aquatic ecosystems, marine policy			
University coordinating the course: University of Gdańsk,			
Participating universities: University of Algarve, Nord University			
Total ECTS:	5	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course will provide basic knowledge of the idea of sustainable fishery and tools used to obtain circumstances where the fish population does not decline over time because of fishing practices.			
Course Content:			
The course will provide basic knowledge of the idea of sustainable fishery and tools used to obtain circumstances where the fish population does not decline over time because of fishing practices. Sustainability in fisheries combines the population dynamics of fisheries, with practical strategies, such as avoiding overfishing (individual fishing quotas, curtailing destructive and illegal fishing practices by appropriate law and policy), setting up protected areas, restoring collapsed fisheries, incorporating all externalities involved in harvesting marine ecosystems into fishery economics, educating stakeholders and the wider public, and developing independent certification programs.			

Keywords: sustainable fishery, fishery economics, dynamics of fisheries

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *to characterise sustainability in fisheries, fishing quotas, illegal fishing practices,*
- *to characterise good fishing practices and what type of methods should be used for this purpose,*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *to select appropriate fishing methods, taking into account aspects related to sustainable fishing and the protection of marine resources,*

- to characterise and select appropriate certification methods.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- to express its opinion on the need to take into account environmental and economic aspects as well as those related to the traditions of local societies in fishing practices.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	2	2 x 4h = 8h
Lectures	8	8 x 2 h = 16h
Workshops	4	4 x 3 h = 12 h
Seminars	2	2 x 2 h = 4 h
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	2	60%
Presentations	4	40%

Assessment Criteria:

Results of written exercises

Attendance

Evaluation of presentations

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Longhurst Alan, 2010. *Mismanagement Marine Fisheries*. Cambridge University Press.

Alessandro Lucchetti, Antonello Sala, Emilio Notti, Suzan Kholeif, 2015. *Towards Sustainable Fisheries Management: A Perspective of Fishing Technology Weaknesses & Opportunities with a Focus on the Mediterranean Fisheries*. NOVA Science Publishers INC International Concepts.

Hansjoachim Ratz, 2016. *Sustainable Fisheries Management*. AURIS REFERENCE LIMITED; First Edition (January 1, 2016).

SBE324-P2. Introduction to Marine Biotechnology

Course name: Introduction to Marine Biotechnology			
Course Code: SBE324-P2			
Field(s)/area(s) of study: biotechnology, aquaculture			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	NO (The course includes instruction and laboratory work in person)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Cell Biology and Biochemistry or equivalent		
Short course description:			
The course aims to show students the application of biotechnology to the study, management and (sustainable) exploitation of oceans. Marine habitats are overexploited and intensively modified so species are committed to adapt or irremediably face extinction. Blue biotechnology becomes a multidisciplinary field aiming to contribute to a sustainable exploitation of marine natural resources and to evaluate species/population extinction rates based on the species abilities to adapt to environmental changes and overfishing (among others). In this course students will learn to apply genomics (and other -omics) to the study of marine biodiversity, with special focus on the study of marine microbiomes using metagenomics to identify species producing new natural products.			

Course Content:

1. Introduction to biotechnology

- Biotechnology – definition and its historical development
- Current biotech industry and its major components
- Biodiversity of marine organisms and their potential in modern biotechnology

2. Aspects of bio-production

- Pre-treatment methods
- Isolation, harvesting, selection, optimization
- Bioreactors in marine biotechnology (e.g. fermentation)
- Valorisation and technology
- Sustainability and bioprocessing (e.g., small molecular metabolites)
- Aquaculture
- Marine manufacturing facilities (e.g., land-based aquaculture)

3. Compound isolation

- Compounds' isolation and purification
- Compounds' characterization (e.g., derivatization, X-ray analysis, NMR)
- Hyphenated chromatographic analysis (e.g., LC-MS/MS, GC, electrophoresis)

4. Activity assessment

- *In vitro* and *in vivo* bioactivity assessment (e.g. cytotoxicity, antibiotic activity, antifungal);
- Structure activity relationship (e.g., *in silico*)

5. Gene and protein technologies

- Genetics, genomics and other -omics
- Environmental DNA: sampling and markers
- Species identification: barcode of life, metagenomics, environmental DNA
- Genetic diversity: Climate change and adaptive genetics
- Organisms and marine products of interest in biotechnology
- Genetic and genomic improvement in aquaculture
- Chromosomal manipulation to obtain polyploids in fish and molluscs

6. Applications

- 3.1. Food, feed
- 6.2. Energy
- 6.3. Pharmaceuticals and supplements
- 6.4. Cosmetics and nutraceuticals

6.5. Biomaterials and construction

6.6. Bioremediation

6.7. Innovation and prospects of marine biotechnology

7. Bioethics and Biosafety

- Sustainability aspects and circularity (e.g., waste treatment)
- Environmental biosafety and regulations (e.g. Nagoya agreement);
- Intellectual Property Rights (IPR), patents, copyrights in blue biotechnology

Keywords: aquaculture, biotechnology, marine biodiversity, natural products, side streams upstream & downstream processing, valorisation, genetics

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations-

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge:

By the end of the course the student will be able to:

1. To know and understand basic concepts related to marine biotechnology;
2. To know the different groups of organisms of interest in Biotechnology, their biology and biotechnological exploitation;

3. To design and evaluate genetic improvement programs;
4. To evaluate extinction risk of species based on population genetics indexes (diversity and structure).

2. Skills (know-how):

By the end of the course the student will be able to:

1. To know and apply genetics and genomics for the study and sustainable exploitation of marine ecosystems.
2. To apply metagenomics for species identification.
3. To monitor marine biodiversity using environmental DNA techniques.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

1. apply some basic laboratory procedures
2. communicate with various biotech stakeholders
3. develop critical thinking and provide a rationale within biotech subject areas
4. know about the possibilities for the application of (marine) biological resources
5. know ethical, legal and societal aspects of biotechnologies

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*).

Method	Number of sessions	Duration
Labs:	2	4h (Total 8h)
Lectures	10	2h (Total 20h)
Oral presentation	2	2h (Total 4h)
Seminar	2	2h (Total 4h)
Group Learning	2	2h (Total 4h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting, %
Oral examination (open questions)	30 min length of the exam per student	100%
Seminars (pass / fail)		0%
Labs (pass / fail)		0%
Oral presentations (pass / fail)		0%
Assessment Criteria: The assessment will be prepared as a portfolio that consists of an oral exam, two lab reports, oral presentations, and seminars <ul style="list-style-type: none"> - 100 % - Oral exam (30 min length / student) for grading A-F - Two lab reports (fail / pass); - Oral presentations (fail / pass); - Seminars (fail / pass) 		
Moodle/other: Learning materials (under construction), short articles – case studies, presentations for the course with updated videos, podcasts, movies. Any item can be selected as a mandatory source by the teacher. A suggested list of readings includes non-mandatory sources: <ul style="list-style-type: none"> ▪ Thieman, W.J. & Palladino, M.A. Introduction into Biotechnology, Pearson, 4th Global Edition, 2019, p.428. ▪ European Science Foundation, Marine Biotechnology: A New Vision and Strategy for Europe, Paper 15, September 2010, pp. 1-93. ▪ Rotter, A.. et al. (2021) The Essentials of Marine Biotechnology, Frontiers in Marine Science, 8, 629629. ▪ Uzochukwu et al. Biosafety and Bioethics in Biotechnology: Policy, Advocacy and Capacity Building, Routledge, 1st edition, 2022, p. 238. ▪ Collins J., Broggiato A., Vanagt T. (2018) Blue Biotechnology Chapter 2. In: Blue Growth and the New Maritime Economy, pp. 39-71. ▪ Zhang Y. et al. (2011) Bioreactor technology in marine microbiology: From design to future application, Biotechnology Advances, 29, pp. 312-321. ▪ Castle D. The Role of Intellectual Property Rights in Biotechnology Innovation, Edward Elgar Publishing, 1st edition, 2009, p. 480. ▪ Dewick P.M. Medical Natural Products: A biosynthetic approach, Wiley VCH, 2009, p. 550. ▪ Carroll, A.R. Marine Natural Products, Nat. Prod. Rep. 2023,40, 274-325, DOI ▪ https://doi.org/10.1039/D2NP00083K 		

- Romano, G., et al. Biomaterials and Bioactive natural Products from marine Invertebrates: From Basic research to Innovative Applications, *Marine Drugs*, 2022, 20, 210;
- Moghaddam et al. Recent highlights of biosynthetic studies on marine natural products, *Org. Biomol. Chem.* **2021**, 19, 123-140.
- Lu et al. Application of marine natural products in drug research, *Bioorg. Med. Chem.* **2021**, 35, 116058.
- Senadheera et al. Marine Bioactives and Their Application in the Food Industry: A Review, *Appl. Sci.* **2023**, 13, 12088

Inclusiveness: In this course, we ensure the equal treatment and diversity of all students through common oral presentations, laboratories, common seminars, and examination. All students have to introduce themselves to the students' community at the beginning of the course where all barriers will be removed. Students including minorities will be well integrated in study groups through random assignment of a lecturer.

Ethics: The ethical concerns are mostly referred to students who will attempt to perform interviews and surveys with the human participants-stakeholders. All ethical concerns will be resolved through the ethical committee if required.

SBE325-P2. Leadership & Communication

Course name: Leadership and Communication			
Course Code: SBE325-P2			
Field(s)/area(s) of study: Corporate Finance, SECS-P/08			
University coordinating the course: University of Gdansk			
Participating universities:			
Total ECTS:	5 ECTS	Language instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
This study-unit will introduce students to the importance of education, outreach, and the broader impact of ocean sciences research. It helps students develop their communication skills at various outreach platforms: conducting radio and TV interviews, article-writing, stage performance and presentations, social media principles, and best practice. The design of adequate questionnaires and use of digital arts are explained. The study-unit showcases the success stories of citizen science campaigns.			
Course Content:			
1. Managers – roles and tasks. Management styles. 2. Manager vs. leader in the organisation. Famous leaders. 3. Competences of effective leaders. 4. Delegating tasks, providing feedback. Coaching. Empowerment. Motivating employees - rewarding and punishing.			

<p>5. Personal performance of a leader. 6. Managing remote teams. 7. Communication in team.</p>		
<p>Keywords: Management styles, leaders, empowerment, motivation,</p>		
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.</p> <p>PLO5. Identify the different economic actors and stakeholder groups in blue industries.</p> <p>PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.</p>		
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Identify the different economic actors and stakeholder groups in ocean-based industries. • Identify the leader position in the team. • Identify roles in the company. <p>2. <u>Skills</u> (know-how): <i>Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Solve the problems and propose solutions (in the group) <p>3. <u>Autonomy & Responsibility:</u> <i>Ability to utilise knowledge and skills in an independent manner in different situations.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • See the difference between leader and manager and other group members. • Communicate in the group. 		
<p>Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)</p>		
Method	Number of sessions	Duration
Fieldwork	5	2h (tot = 10h)
Lectures	5	2h (tot = 10h)

Oral presentation	5	2h (tot = 10h)
Seminar	5	2h (tot = 10h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral examination		40%
Project		60%
Assessment Criteria: <ul style="list-style-type: none"> • Oral exam • Development and presentation of a project 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)</i> <ul style="list-style-type: none"> • P.F. Drucker, <i>The Essential Drucker: The Best of Sixty Years of Peter Drucker's Essential Writings on Management</i>, Collins Business Essentials, 2008 • W.G. Bennis, <i>On becoming a leader</i>, Basic Books, 1989 • S. Sinek, <i>Leaders Eat Last: Why Some Teams Pull Together and Others Don't</i>, 2014 • D.H. Pink, <i>Drive: The Surprising Truth About What Motivates Us</i>, 2011 		

SBE326-P2. Fish Biology

Course name: Fish biology			
Course Code: SBE326-P2			
Field/area of study: aquatic biology			
University coordinating the course: University of Gdańsk			
Participating universities: University of Cadiz			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	This section should be filled in for all the courses at programme level.		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course gives knowledge of the basic fish biology and ecology with special emphasis to marine fishes. Basic methods of ichthyological investigations will be presented and practised. Course contents: fish biology investigation principles, fish anatomy, fish reproduction, fish growth, fish behaviour, fish ecology, marine fish scientific sampling			
Course Content: This course offers a comprehensive exploration of fish diversity, anatomy, physiology, behaviour, ecology, and conservation. Beginning with an introduction to fish classification and evolutionary history, it covers external and internal anatomy, focusing on the skeletal, muscular, respiratory, circulatory, digestive, nervous, and reproductive systems. The course delves into fish physiology, including respiration, circulation, osmoregulation, excretion, and sensory systems, while also examining reproductive strategies and developmental stages. Ecological topics include habitat distribution,			

community interactions, feeding ecology, and migration patterns, emphasizing the role of fish in aquatic ecosystems. Conservation and management modules address threats to fish populations, sustainable practices, regulatory frameworks, and aquaculture principles. Research methods encompass field and laboratory techniques, data analysis, and ethical considerations. Specialized topics like ichthyology, stress physiology, fish behaviour, and the impacts of climate change are also covered. Practical components involve laboratory sessions, field trips, and independent projects, with assessment through exams, assignments, and presentations, ensuring a well-rounded education that integrates theoretical knowledge with practical skills and a strong emphasis on ecological understanding and conservation efforts.

Keywords: Fish biology and ecology, ichthyofauna, marine fishes, fish behaviour

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

understand bioecological factors influencing fish populations, analyse results of ichthyological investigations, use scientific language

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

use and understand scientific language related to marine fish biology and understand basic ichthyological problems and their connections to other branches of science

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

perform the dissection of a fish, perform global and detailed ichthyological analysis, know how to estimate age and condition of fish, describe fish behaviour using scientific language		
Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, fieldtrips, etc.</i>)		
Method	Number of sessions	Duration
Lecture	3	3 x 2 h
Practical Study-Unit	5	5 x 5 h
Fieldwork	2	1 x 5 h 1 x 4 h
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	1	60%
Oral Examination	1	20%
Fieldwork	5	20%
Assessment Criteria: Results of examination Attendance Evaluation of fieldwork		
Study materials/Course literature: (<i>hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature</i>) Bone Q.M.A., Marshall N.B., 1982, Biology of fishes, Blackie, Glasgow and London. Brown T. A., 2006, Genomes, Garland Science. Cailliet G.M., Love M.S., Ebeling A.W., 1986, Fishes, Wadsworth Publishing Company, Belmont, California. Campana, S. E., and J. D. Neilson. 1985. Microstructure of fish otoliths. Can. J. Fish. Aquat. Sci. 42: 1014–1032.		

Emery W.J, Thomson R.E., Data analysis methods in physical oceanography. Elsevier 1997.

Hartl D.L., Clark A.G., 2007, Principles of population genetics, Sinauer Associates, Sunderland.

Hoar W.S. & D.J. Randall, Fish physiology, 2011.

Holt G. J., Larval fish nutrition, Wiley Blackwell, 2011.

Huet M., 1994. Textbook of Fish Culture. Breeding and Cultivation of Fish. Fishing News Books, Blackwell Scientific Publ., Ltd., Oxford.

Lagler K.F., Bardach J.E., Miller R.R., May Passino D.R., 1997, Ichthyology, Wyd. John Wiley & Sons, New York, Chichester, Brisbane, Toronto.

Richmond, Handbook of Microalgal culture, Blackwell, 2003.

Ricker W.E., 1975, Computation and Interpretation of Biological Statistics of Fish Populations, Department of the Environment Fisheries and Marine Service, Ottawa 1975, p:382.

Schreck C.B., Mole P. B., 1990, Methods for Fish Biology American Fisheries Society, Bethesda, Maryland.

Sloman K., Balshine S., Wilson R. (eds), Fish Physiology: Behaviour and Physiology of Fish, ELSEVIER, Academic Press, 2005, pp. 504.

Smith, L.S. 1982. Introduction to Fish Physiology – T.F.H. Publication, Inc.

Wotton R. J., 1992, Fish Ecology, Springer; ISBN-10: 0216931525.

- Extracurricular readings

Baldisserotto Bernardo, J.M. Mancera Romero, B.G. Kapoor (Eds) 2007. Fish Osmoregulation. Science Publishers.

Campana, S. E., and J. D. Neilson. 1985. Microstructure of fish otoliths. Can. J. Fish. Aquat. Sci. 42: 1014–1032.

David H. Evans, James B. Claiborne (Eds). 2005. The Physiology of Fishes, Third Edition. Hardback CRC Press.

Harden Jones F. R., 1970, Fish migrations Edward Arnold Ltd. London.

Hoar W.S., D.J. Randall. 1971. Fish Physiology (I-V). Academic Press Inc.

Roderick Nigel Finn, B.G. Kapoor (Eds). 2008. Fish Larval Physiology. Science Publishers.

Schreck C.B., Mole P. B., 1990, Methods for Fish Biology American Fisheries Society, Bethesda, Maryland.

Secor, D. H., J. M. Dean, and E. H. Laban. 1992. Otolith Removal and Preparation for Microstructural Examination: A User's Manual. The Electronic

Power Research Institute and the Bell W. Baruch Institute for Marine Biology and Coastal Research.

SBE327-P2. Integrated Aquaculture

Course name: Integrated Aquaculture			
Course Code: SBE335-P3			
Field(s)/area(s) of study: aquaculture, biology and ecology of aquatic flora and fauna			
University coordinating the course: University of Gdańsk			
Participating universities: Nord University, University of Cadiz, University of Split			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h)		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims to provide basic and applied knowledge of interest for aquaculture, with emphasis in sustainable aquaculture practices.			
Course Content:			
1. General introduction			
The course will address the following topics: Principles and concepts of aquatic organism production (types of aquaculture according to species, habitat, degree of intensity and production systems; types and design of aquaculture facilities; aquaculture of microalgae, macrophytes, molluscs, crustaceans and fish); Abiotic and biotic factors influencing aquaculture production; Physiological basis of aquaculture (sensory physiology and biological rhythms, development, reproduction, osmoregulation and excretion, nutrition, metabolism, stress and welfare); Genetics and reproduction in aquaculture			

(genetic markers, genetic improvement and selection, reproductive biotechniques); Pathology in aquaculture (viral, bacterial, fungal and parasitic diseases); Environmental impacts of aquaculture and mitigation strategies; Integrated multi-trophic aquaculture. The course will focus on the most important species for European aquaculture.

2. Aquaculture in the Mediterranean basin

Trends in the development of modern aquaculture in subtropical and tropical regions, breeding species, specificity of warm-water breeding, development possibilities.

3. Aquaculture in temperate and cold areas

Trends in the development of modern aquaculture in temperate and cold regions, breeding species, specificity of cold-water breeding, development possibilities.

Keywords: development of modern aquaculture, aquaculture products, impact of aquaculture on the natural environment

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs)

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- to use a properly terminology in aquaculture and related sciences
- to identify threats to the aquatic environments on a local and global scale as a consequence of the development of aquaculture

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- to formulate and solve problems regarding aquaculture, integrating knowledge from various fields and scientific disciplines and propose solution

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- to plan, implement and supervise, individually or in a team, subsequent stages of the entrusted task in the field of aquaculture, to take responsibility for its results, cooperates effectively in a team

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	3	3h x 8 = 24
Lectures	4	2h x 5 = 10
Seminars	3	2h x 3 = 6
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written exercises	2h	60%
Report	2000 words	40%

Assessment Criteria:

- Attendance and participation in class.
- Report
- Written exercises

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Rana K.J., 2007. Regional Review on Aquaculture Development 6. Western-European Region – 2005. FAO Fisheries Circular No. 1017/6, ISSN 0429-9329.

Stickney R.R. (ed.), 2000. Encyclopedia of Aquaculture. John Wiley&Sons, Inc., ISBN: 978-0-471-29101-5.

Varadi L., Szucs I., Pekar F., Blokhin S., Csavas I., 2001. Aquaculture development trends in Europe, W: Subasinghe R.P., Bueno P.B., Phillips M.J., Hough C., McGladdery S.E., Arthur J.R. (red.) Aquaculture in the Third Millennium - Technical Proceedings of the Conference on Aquaculture in the Third Millennium, pp. 397–416. Bangkok, Thailand. 20–25 February 2000. NACA, Bangkok and FAO, Rome. 471 pp.

SBE328-P2. Specialised Workshop at Sea & in the Coastal Zone

Course name: Specialized workshop at sea and in the coastal zone			
Course Code: SBE328-P2			
Field(s)/area(s) of study: oceanography			
University coordinating the course: University of Gdańsk			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	This section should be filled in for all the courses at programme level.		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
Developing and improving the student's skills in the field of interdisciplinary research work at sea using advanced techniques scientific tools and methods.			
Course Content:			
Practice of collaboration in a research team in planning, performing and developing marine ecosystem studies. Student will become familiar with advanced methods used in research on the functioning of marine ecosystems: CTD probe, acoustic current meter, hydroacoustic devices, bathymetric rosette, automatic weather station, sediment trap, sediment probes, plankton nets and others. The course will also provide knowledge about the taxonomic, temporal-spatial and functional diversity of ecological formations in the coastal and deep-water zone of the Baltic Sea.			

Keywords: Interdisciplinary research work at sea, advanced techniques scientific tools and methods used in marine research

Programme Learning Outcomes (PLOs)

PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- to define specialized terminology used in researching marine ecosystems
- to characterise research methods used in marine and related sciences
- to describe the latest research trends in marine research
- to define the basic safety rules for the work in a laboratory, at the sea and on a land

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- to plan and conduct field and laboratory research in the marine environment
- to analyze research results
- to work individually and cooperate in laboratory and field groups

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- to plan, implement and supervise, individually or in a team, subsequent stages of the tasks,
- to take responsibility for its results
- to cooperate effectively in a team
- to apply occupational safety rules, take care of the specialized equipment entrusted to him, recognize threat situations and take appropriate actions

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)		
Method	Number of sessions	Duration
Fieldwork	2	2 x 10 h = 20 h
Workshops	4	4 x 5 h = 20 h
Total teaching contact hours:	40 h	
Self - study time	85h	
Total Learning hours	125 h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	2h	60%
Presentation	2h	40%
Assessment Criteria: Attendance. Oral Presentation. Written exercises.		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...) Claudia Castellani, Claudia Castellani, Martin Edwards, 2017. Marine Plankton, A Practical Guide to Ecology, Methodology, and Taxonomy. Oxford University Press. Alasdair McIntyre, Anastasios Eleftheriou, 2008. Methods for the Study of Marine Benthos. Wiley. Scott Milroy, 2022. Field Methods in Marine Science, From Measurements to Models. CRC Press. Anne Gro Vea Salvanes, Henrik Glenner, Jennifer Devine, Jon Thomassen Hestetun, Kjeersti Sjøtun (Ed), Kjersti Sjøtun, Knut Helge Jensen, 2018. Marine Ecological Field Methods, A Guide for Marine Biologists and Fisheries Scientists. Wiley.		

SBE329-P2. Mining & Renewable Energy

Course name: (Deep Sea) Mining and Renewable Energy			
Course Code: SBE329-P2			
Field(s)/area(s) of study: Marine Science, Marine Geology, Energy			
University coordinating the course:			
Participating universities: University of Gdańsk, University of Split			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of the course is to introduce the mineral (polymetallic, energy) resources found in the oceans, which could gain enormous economic importance in the near future. Issues related to the importance of raw materials in the development of civilization, polymetallic (e.g. Fe-Ms concretions, massive sulphides, cobalt-rich crusts) and energy (e.g. gas hydrates) deposits in the marine environment, geological conditions for their occurrence, legal basis for their exploitation and the effects of potential mining will be presented. Students will learn about the use of ocean thermal energy, wave energy current, tidal, and offshore wind power.			
Course Content: 1. The role of minerals, metals and energy in society today 2. The motivations for deep-sea mining 3. Regulatory frameworks and processes			

4. Types of deep-sea mineral deposits and geological conditions of their distribution
5. Basics of exploration, extraction of deep-sea minerals
6. Environmental risks of deep-sea mining
7. Ocean energy - thermal energy, wind energy, wave and tidal energy,
 1. floating solar, salinity gradient, algae (biofuel), etc.
8. Marine renewable energy power plants; Hybrid power plants
9. Technologies advancements in marine renewable energy sources applications in producing clean and sustainable electricity
10. Strategies and objectives of EU in generating clean sustainable energy from marine renewable energy sources

Keywords: marine mineral resources, deep sea mining, manganese nodules, cobalt crusts, massive sulfides, gas hydrates, International Seabed Authority, OTEC, marine renewable energy sources, clean & green energy, sustainability

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *describe the occurrence of the main mineral resources in the marine environment in relation to their genesis*
- *describe the benefits and risks associated with the exploitation of mineral resources from the seabed*
- *describe types of renewable energy which can be obtained from the marine environment*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- formulate the main challenges and problems related to obtaining mineral resources from the marine environment and obtaining renewable energy
- speak and communicate in scientific and socially accessible language about marine mineral resources
- assess the impact of marine mining on marine ecosystems
- express individual views on the use of the marine mineral resources
- discuss about marine renewable energy technologies applications in process of producing clean energy

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- develop knowledge independently
- communicate and cooperate in a team
- use arguments in discussion
- think critically on the topic of marine mineral resources and their use
- critically discuss about marine renewable energy sources, their technology solutions and applications

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Workshop	5	2h (total 10h)
Lectures	10	2h (total 20h)
Seminars	5	2h (total 10h)
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Poster		20%
Oral presentation		40%
Written exercises		40%

Assessment Criteria:

- Development of a project - poster.
- Presentation of project by students, oxford debate.
- Attendance and participation in workshop, seminars, lectures.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)*

GURVICH E. G.: Metalliferous Sediments of the World Ocean. Springer, 2006.

Marine Resources – Opportunities and Risks. World Ocean Review, 3, 2014

MAX M. D., JOHNSON A. H., DILLON W. P.: Economic Geology of Natural Gas Hydrate, Springer, 2006

A Joint Publication by the United Nations Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs and the International Seabed Authority
Marine Mineral Resources. Scientific Advances and Economic Perspectives
Cobalt-rich ferromanganese crust:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG9.pdf>

Contractors for Seabed Exploration:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG3.pdf>

Marine mineral resources:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG6.pdf>

Polymetallic nodules:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG7.pdf>

Protection of the Seabed Environment:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG4.pdf>

Seabed technology:

<http://www.isa.org.im/files/documents/EN/Brochures/ENG10.pdf>

Beaulieu, S.E., Graedel, T.E., Hannington, M.D. 201. Should we mine the deep seafloor? Earths Future 5, 655–658. doi:10.1002/2017EF000605

Hannington, M., Petersen, S., and Jamieson, J. 2023. Another look at marine minerals. SEG Discovery 134: 19-30. doi: 10.5382/SEGnews.2023-134.fea-01

Fundamentals of Ocean Renewable Energy, Generating Electricity from the Sea: Simon P. Neill, M Reza Hashemi, Academic Press, 2018.

Marine Renewable Energy, Resource Characterization and Physical Effects: Zhaoqing Yang, Andrea Copping, Springer, 2017.

Renewable Energy from the Oceans, From Wave, Tidal and Gradient Systems to Offshore Wind and Solar: Domenico P. Coiro, Tonio Sant, Institution of Engineering and Technology, 2019.

EU, Marine renewable energy:

https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/marine-renewable-energy_en

Pathway 3. Human Impact in the Arctic (NORD)

SBE331-P3 Human Health & Physical Activity related to the Sea; Blue sports

Course name: Human Health and Physical Activity in the Ocean; Blue space			
Course Code: SBE331-P3			
Field(s)/area(s) of study: Outdoor and Nature Education, Sport Sciences, Physical Education, Leisure Studies			
University coordinating the course: NORD University			
Participating universities: University of Split, University of Malta (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per 5 ECTS Credit	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Ability to swim		
Short course description: You have heard about Blue Space, Blue Mind & Hydrophilia? Maybe have joined the trend and gone for a “wild swim”? This course introduces two physical activities in the ocean (swimming and kayaking/canoeing) in both theory and practice. Those have the potential to improve mental and physical health and provide a sustainable connectedness to the surrounding nature.			
Course Content: <ul style="list-style-type: none">• Learning about the concepts of Blue Space, Blue Mind and Hydrophilia• Knowledge about effects on mental and physical health when doing physical activities in and on the sea• Theory and practice of Openwater swimming, cold water swimming and kayaking in the ocean.			

Keywords:

Physical Activities in the Ocean

Blue Space & Blue mind, health and wellbeing

Hydrophilia, nature and sustainable leisure/living in the Arctic

Programme Learning Outcomes (PLOs):

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Know the basic ideas and facts behind the concepts of blue space, blue mind and hydrophilia.
- Have knowledge about hydrodynamics and other theory about swimming and human beings.
- Understand the meaning of water competence.
- Knows the most important challenges and dangers when swimming or kayaking in the ocean.
- Distinguish between types of cold-water swimming and the sport "Open water swimming" as represented by the World Aquatics.
- Have knowledge about nature in and around the ocean and how to behave responsible in the environment.
- Know the effects of sauna bathing in combination with cold water.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Practice Open Water swimming in the ocean with wetsuit adapted to her/his own level.
- Carry out ocean swimming in cold water without wetsuit in regard to her/his own swimming ability.

- Practise basic paddling techniques at sea and have basic skills in Friluftsliv by the sea.
- Experience mental and physical effects of being in and on the sea.
- Practice water competence including self-rescue as well as rescuing others with accessible rescue tools.
- Have basic skills in Friluftsliv by the sea, including clothing and equipment, orienteering and cooking on campfires.
- Show respect for the surrounding nature and behave "without traces"
- Combine cold water immersion with Sauna bathing in a healthy manner.
- Argue for the mental and physical health benefits.
- Plan swimming activities in cold water including a risk analysis and regarding wellbeing.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Carry out an ocean swim in cold water related to the participants physical and mental abilities.
- Guide other people in using cold water immersion and sauna bathing in a healthy way.
- Be able to reflect on how blue sports can be carried out in a sustainable manner, for different types of groups in an appropriate and safe way.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
Fieldwork	Water basics in the pool	2 teaching hours
	Lifesaving outdoors	Half day
Fieldwork	Openwater swimming with neoprene suit/ wetsuit	One day
Fieldwork	Coldwater swimming & pre – and post activities for cws	One day
Fieldwork	Basic kayak techniques	One day
Fieldwork	Kayak trip on the sea	Two days

Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
		50:50
Assignment 1		Reflective diary on experiences and learning from kayaking on the sea, and on how to apply competence in friluftsliv (life out in the open air) by the sea in a preferred pedagogical setting
Assignment 2		Presentation of recent research article about an appropriate topic from the course, both oral & written
Assessment Criteria: passed / not passed		
<p>Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)</i></p> <p>Britton, E., Kindermann, G., Domegan, C., Carlin, C. (2018). Blue care: a systematic review of blue space interventions for health and wellbeing. Health Promotion International, 35, 50-69. https://doi.org/10.1093/heapro/day103</p> <p>Cracknell, D. (2019). By the Sea. The therapeutic benefits of being in, on and by the water. London: Aster</p> <p>Dowd, J., & Hoffmeister, F. (2015). Sea Kayaking: The Classic Manual for Touring, from Day Trips to Major Expeditions (Sixth edition.). Greystone Books.</p> <p>Foley, R., Kearns, R., Kistemann, T. (2019). Blue Space, Health and Wellbeing. London: Routledge</p> <p>Harper, M. (2022): Chill. The Cold Water Swim Cure. San Francisco: Chronicle Prism.</p>		

Knechtle, B. Waskiewicz, Z. et al. (2020): Cold Water Swimming—Benefits and Risks: A Narrative Review», Environmental Research and Public Health. doi: 10.3390/ijerph17238984

Nichols, W. (2014). Blue Mind. Back Bay Books.

+ Handouts from the lectures

SBE332-P3 Sustainable Coastal Tourism

Course name: Sustainable Coastal Tourism			
Course Code: SBE332-P3			
Field(s)/area(s) of study: Tourism			
University coordinating the course: Nord University			
Participating universities: University of Split (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of the course is to provide understanding of tourism in coastal areas. Demand behaviour and destination resources are explained followed by examination of positive and negative tourism impacts with highlighting tourism seasonality as a key obstacle to sustainability. Basics of tourism destination management and marketing are presented. Down the line principles of sustainable tourism development are given together with fundamentals of strategic tourism planning.			
Course Content: Tourism demand motivation, push factors and trends Coastal and marine tourism (resources, characteristics and issues) Tourism impacts monitoring and measuring (economic, environmental, social and cultural)			

Sustainable tourism development (sustainability, carrying capacity and development analysis)

Tourism seasonality (definition, causes, impacts and strategies)

Tourism strategic planning (governance, tourism policy and strategy)

Tourism destination management and marketing (destination product development, experience design, smart tourism)

Keywords: coastal and marine tourism, tourism impacts, sustainability, destination management and marketing

Programme Learning Outcomes (PLOs)

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

Understand the concept of coastal tourism encompassing demand behaviour, destination resources and tourism impacts

Understand principles of sustainable tourism development

Understand destination management and marketing functions and methods

Understand the role and importance of planning and strategy making sustainable tourism destination development

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Identify tourism impacts

Develop a strategic analysis of the destination context

Use management and marketing concepts and techniques

Propose a sustainable tourism destination product

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

Think critically

Address sustainable development issues

Work individual and in teams

Communicate in oral and writing

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lecture	10	2,5h x 10 = 25h
Seminar	10	1,5 x 10 = 15h
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case study (take home)		100%
Assessment Criteria: Case study (written assignment) 100%		
Study materials/Course literature: Morrison, A. (2024) Marketing and management tourism destinations (3rd edition). Routledge Bramwell, B. (2004), <i>Coastal Mass Tourism, Diversification and Sustainable Development in Southern Europe</i> , Channel View Publications, Clevedon https://www.unwto.org/ https://wtmc.org/		

SBE333-P3 Introduction to Marine Biotechnology

Course name: Introduction to Marine Biotechnology			
Course Code: SBE333-P3			
Field(s)/area(s) of study: biotechnology, aquaculture			
University coordinating the course: Nord University			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	NO (The course includes instruction and laboratory work in person)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims to show students the application of biotechnology to the study, management and (sustainable) exploitation of oceans. Marine habitats are overexploited and intensively modified so species are committed to adapt or irremediably face extinction. Blue biotechnology becomes a multidisciplinary field aiming to contribute to a sustainable exploitation of marine natural resources and to evaluate species/population extinction rates based on the species abilities to adapt to environmental changes and overfishing (among others). In this course students will learn to apply genomics (and other -omics) to the study of marine biodiversity, with special focus on the study of marine microbiome using metagenomics to identify species producing new natural products.			

Course Content:

1. Introduction to biotechnology

- Biotechnology – definition and its historical development
- Current biotech industry and its major components
- Biodiversity of marine organisms and their potential in modern biotechnology

2. Aspects of bio-production

- Pre-treatment methods
- Isolation, harvesting, selection, optimization
- Bioreactors in marine biotechnology (e.g. fermentation)
- Valorisation and technology
- Sustainability and bioprocessing (e.g., small molecular metabolites)
- Aquaculture
- Marine manufacturing facilities (e.g., land-based aquaculture)

3. Compound isolation

- Compounds' isolation and purification
- Compounds' characterization (e.g., derivatization, X-ray analysis, NMR)
- Hyphenated chromatographic analysis (e.g., LC-MS/MS, GC, electrophoresis)

4. Activity assessment

- *In vitro* and *in vivo* bioactivity assessment (e.g. cytotoxicity, antibiotic activity, antifungal)
- Structure activity relationship (e.g., *in silico*)

5. Gene and protein technologies

- Genetics, genomics and other -omics
- Environmental DNA: sampling and markers
- Species identification: barcode of life, metagenomics, environmental DNA
- Genetic diversity: Climate change and adaptive genetics
- Organisms and marine products of interest in biotechnology
- Genetic and genomic improvement in aquaculture
- Chromosomal manipulation to obtain polyploids in fish and molluscs

6. Applications

- Food, feed
- Energy
- Pharmaceuticals and supplements
- Cosmetics and nutraceuticals
- Biomaterials and construction

- Bioremediation
- Innovation and prospects of marine biotechnology

7. Bioethics and Biosafety

- Sustainability aspects and circularity (e.g., waste treatment)
- Environmental biosafety and regulations (e.g. Nagoya agreement);
- Intellectual Property Rights (IPR), patents, copyrights in blue biotechnology

Keywords: aquaculture, biotechnology, marine biodiversity, natural products, side streams upstream & downstream processing, valorisation, genetics

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations-

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge:

By the end of the course the student will be able:

1. To know and understand basic concepts related to marine biotechnology;
2. To know the different groups of organisms of interest in Biotechnology, their biology and biotechnological exploitation;
3. To design and evaluate genetic improvement programs;

4. To evaluate extinction risk of species based on population genetics indexes (diversity and structure).

2. Skills (know-how):

By the end of the course the student will be able:

1. To know and apply genetics and genomics for the study and sustainable exploitation of marine ecosystems.
2. To apply metagenomics for species identification.
3. To monitor marine biodiversity using environmental DNA techniques.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

1. apply some basic laboratory procedures
2. communicate with various biotech stakeholders
3. develop critical thinking and provide a rationale within biotech subject areas
4. know about the possibilities for the application of (marine) biological resources
5. know ethical, legal and societal aspects of biotechnologies

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*). See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
Labs:	2	4h (Total 8h)
Lectures	10	2h (Total 20h)
Oral presentation* *Presentation of the student project	2	2h (Total 4h)
Seminar	2	2h (Total 4h)
Group Learning*	2	2h (Total 4h)
Total teaching contact hours:	40h	
Self - study time	85h	

Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting, %
Oral examination (open questions)	30 min length of the exam per student	100%
Seminars (pass / fail)		0%
Labs (pass / fail)		0%
Oral presentations (pass / fail)		0%
Assessment Criteria: The assessment will be prepared as a portfolio that consists of an oral exam, two lab reports, oral presentations, and seminars <ul style="list-style-type: none">- 100 % - Oral exam (30 min length / student) for grading- Two lab reports (fail / pass);- Oral presentations (fail / pass);- Seminars (fail / pass)		
Moodle/other: Learning materials (under construction), short articles – case studies, presentations for the course with updated videos, podcasts, movies. Any item can be selected as a mandatory source by the teacher. A suggested list of readings includes non-mandatory sources: <ul style="list-style-type: none">▪ Thieman, W.J. & Palladino, M.A. Introduction into Biotechnology, Pearson, 4th Global Edition, 2019, p.428.▪ European Science Foundation, Marine Biotechnology: A New Vision and Strategy for Europe, Paper 15, September 2010, pp. 1-93.▪ Rotter, A.. et al. (2021) The Essentials of Marine Biotechnology, Frontiers in Marine Science, 8, 629629.▪ Uzochukwu et al. Biosafety and Bioethics in Biotechnology: Policy, Advocacy and Capacity Building, Routledge, 1st edition, 2022, p. 238.▪ Collins J., Broggiato A., Vanagt T. (2018) Blue Biotechnology Chapter 2. In: Blue Growth and the New Maritime Economy, pp. 39-71.▪ Zhang Y. et al. (2011) Bioreactor technology in marine microbiology: From design to future application, Biotechnology Advances, 29, pp. 312-321.▪ Castle D. The Role of Intellectual Property Rights in Biotechnology Innovation, Edward Elgar Publishing, 1st edition, 2009, p. 480.▪ Dewick P.M. Medical Natural Products: A biosynthetic approach, Wiley VCH, 2009, p. 550.		

- Carroll, A.R. Marine Natural Products, *Nat. Prod. Rep.* 2023,40, 274-325, DOI
- <https://doi.org/10.1039/D2NP00083K>
- Romano, G., et al. Biomaterials and Bioactive natural Products from marine Invertebrates: From Basic research to Innovative Applications, *Marine Drugs*, 2022, 20, 210;
- Moghaddam et al. Recent highlights of biosynthetic studies on marine natural products, *Org. Biomol. Chem.* 2021, 19, 123-140.
- Lu et al. Application of marine natural products in drug research, *Bioorg. Med. Chem.* 2021, 35, 116058.
- Senadheera et al. Marine Bioactives and Their Application in the Food Industry: A Review, *Appl. Sci.* 2023, 13, 12088

Inclusiveness: In this course, we ensure the equal treatment and diversity of all students through common oral presentations, laboratories, common seminars, and examination. All students have to introduce themselves to the students' community at the beginning of the course where all barriers will be removed. Students including minorities will be well integrated in study groups through random assignment of a lecturer.

Ethics: The ethical concerns are mostly referred to students who will attempt to perform interviews and surveys with the human participants-stakeholders. All ethical concerns will be resolved through the ethical committee if required.

SBE334-P3 Sustainable Fisheries Management

Course name: Sustainable Fisheries Management			
Course Code: SBE334-P3			
Field(s)/area(s) of study: ecology of aquatic ecosystems, marine policy			
University coordinating the course: Nord University			
Participating universities: University of Algarve, University of Gdańsk (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course will provide basic knowledge of the idea of sustainable fishery and tools used to obtain circumstances where the fish population does not decline over time because of fishing practices.			
Course Content:			
The course will provide basic knowledge of the idea of sustainable fishery and tools used to obtain circumstances where the fish population does not decline over time because of fishing practices. Sustainability in fisheries combines the population dynamics of fisheries, with practical strategies, such as avoiding overfishing (individual fishing quotas, curtailing destructive and illegal fishing practices by appropriate law and policy), setting up protected areas, restoring collapsed fisheries, incorporating all externalities involved in harvesting marine ecosystems into fishery economics, educating stakeholders and the wider public, and developing independent certification programs.			

<p>Keywords: sustainable fishery, fishery economics, dynamics of fisheries</p>
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.</p> <p>PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.</p> <p>PLO4. Identify the different economic actors and stakeholder groups in ocean-based industries.</p> <p>PLO5. To use marine environmental and socio-economic analysis tools, including data analysis.</p> <p>PLO6. Manage multidisciplinary data with cutting- edge capabilities in the ocean- related industries.</p> <p>PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.</p> <p>PLO8. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.</p> <p>PLO9. Develop sensitivity towards environmental and socio-economic problems in the ocean based on ethical commitment and sustainability.</p> <p>PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.</p> <p>PLO11. To know the socio-economic activities of entities linked to the marine environment, from a sustainability perspective.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> - <i>to characterize sustainability in fisheries, fishing quotas, illegal fishing practices,</i> - <i>to characterize good fishing practices and what type of methods should be used for this purpose,</i> <p>2. <u>Skills</u> (know-how): <i>Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> - <i>to select appropriate fishing methods, taking into account aspects related to sustainable fishing and the protection of marine resources,</i>

- to characterize and select appropriate certification methods.

3. **Autonomy & Responsibility**: Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- to express its opinion on the need to take into account environmental and economic aspects as well as those related to the traditions of local societies in fishing practices.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	2	2 x 4h = 8h
Lectures	8	8 x 2 h = 16h
Workshops	4	4 x 3 h = 12 h
Seminars	2	2 x 2 h = 4 h
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	2	60%
Presentations	4	40%

Assessment Criteria:

Results of written exercises

Attendance

Evaluation of presentations

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Longhurst Alan, 2010. Mismanagement Marine Fisheries. Cambridge University Press.

Alessandro Lucchetti, Antonello Sala, Emilio Notti, Suzan Kholeif, 2015. Towards Sustainable Fisheries Management: A Perspective of Fishing Technology Weaknesses & Opportunities with a Focus on the Mediterranean Fisheries. NOVA Science Publishers INC International Concepts.

Hansjoachim Ratz, 2016. Sustainable Fisheries Management. AURIS REFERENCE LIMITED; First Edition (January 1, 2016).

SBE335-P3 Integrated Aquaculture

Course name: Integrated Aquaculture			
Course Code: SBE335-P3			
Field(s)/area(s) of study: Aquaculture, biology and ecology of aquatic flora and fauna			
University coordinating the course: Nord University			
Participating universities: University of Gdańsk, University of Cadiz (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims to provide basic and applied knowledge of interest for aquaculture, with emphasis in sustainable aquaculture practices.			
Course Content:			
1. General introduction			
The course will address the following topics: Principles and concepts of aquatic organism production (types of aquaculture according to species, habitat, degree of intensity and production systems; types and design of aquaculture facilities; aquaculture of microalgae, macrophytes, molluscs, crustaceans and fish); Abiotic and biotic factors influencing aquaculture production; Physiological basis of aquaculture (sensory physiology and biological rhythms, development, reproduction, osmoregulation and excretion, nutrition,			

metabolism, stress and welfare); Genetics in aquaculture (genetic markers, genetic improvement and selection); Pathology in aquaculture (viral, bacterial, fungal and parasitic diseases); Environmental impacts of aquaculture and mitigation strategies; Integrated multi-trophic aquaculture. The course will focus on the most important species for European aquaculture.

2. Aquaculture in the Mediterranean basin

Trends in the development of modern aquaculture in subtropical and tropical regions, breeding species, specificity of warm-water breeding, development possibilities.

3. Aquaculture in temperate and cold areas

Trends in the development of modern aquaculture in temperate and cold regions, breeding species, specificity of cold-water breeding, development possibilities.

Keywords: development of modern aquaculture, aquaculture products, impact of aquaculture on the natural environment

Programme Learning Outcomes (PLOs)

PLO1. Identify and understand the interdependency of ocean industries, marine ecosystems, and societies that depend on them, with a wide socio-ecological perspective.

PLO2. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO7. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO10. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of economics.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- use a proper terminology in aquaculture and related sciences
- identify threats to the aquatic environments on a local and global scale as a consequence of the development of aquaculture

2. Skills (know-how): Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).

By the end of the course the student will be able to:

- formulate and solve problems regarding aquaculture, integrating knowledge from various fields and scientific disciplines and propose solution

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- plan, implement and supervise, individually or in a team, subsequent stages of the entrusted task in the field of aquaculture, to take responsibility for its results, cooperates effectively in a team

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	3	3h x 8 = 24
Lectures	4	2h x 5 = 10
Seminars	3	2h x 3 = 6
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written exercises	2h	60%
Report	2000 words	40%

Assessment Criteria:

Attendance and participation in class.

- Report
- Written exercises

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)

Rana K.J., 2007. Regional Review on Aquaculture Development 6. Western-European Region – 2005. FAO Fisheries Circular No. 1017/6, ISSN 0429-9329.

Stickney R.R. (ed.), 2000. Encyclopedia of Aquaculture. John Wiley&Sons, Inc., ISBN: 978-0-471-29101-5.

Varadi L., Szucs I., Pekar F., Blokhin S., Csavas I., 2001. Aquaculture development trends in Europe, W: Subasinghe R.P., Bueno P.B., Phillips M.J., Hough C., McGladdery S.E., Arthur J.R. (red.) Aquaculture in the Third Millennium - Technical Proceedings of the Conference on Aquaculture in the Third Millennium, pp. 397–416. Bangkok, Thailand. 20–25 February 2000. NACA, Bangkok and FAO, Rome. 471 pp.

SBE336-P3 Marine Ecosystem Restoration

Course name: Marine Ecosystems Restoration			
Course Code: SBE336-P3			
Field(s)/area(s) of study: marine ecology, marine science, marine conservation			
University coordinating the course: Nord University			
Participating universities: University of Cadiz (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course aims to provide the principles and strategies for the recovery of degraded marine ecosystems, including coastal ecosystems. Ecological succession. Resilience. Theory of steady states. Marine restoration planning. Reference scenario, restoration and rehabilitation. Identification of drivers and stabilizing mechanisms. Selection of target species. Blue carbon accounting and standards of blue carbon. Cost analysis. Nature-based solutions. Restoration field protocols. Marine ecosystem restoration projects. Related 1st and 2nd year courses: Marine Ecosystems and Biodiversity (SB101), Ocean functioning (SBE102)			
Course Content: 1. Introduction to ecological restoration: insights from historical development to future needs. 2. Outline the types of ecosystems and ecosystem services.			

3. Key ecological concepts to restoration plans: from ecological succession, to assess degraded ecosystems or establishment of priorities areas.
4. Introduction to the Short-Term Action Plan on Ecosystem Restoration (STAPER).
5. Assessing institutional, policy and legal frameworks.
6. Strategic planning process I: perspectives about understanding and overcoming limitations in restoration projects.
7. Strategic planning process II: assessment of the ecological benefits of restoration activities.
8. Cost-benefit analysis, accounting processes and resource mobilisation.
9. Monitoring and evaluating the impacts of restoration projects: A case of study.
10. Strategic and risk planning in restoration projects: how to develop implementation tasks, schedules and budgets. Case of study.

Keywords: marine restoration, marine conservation, coastal habitats, ecosystem services

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- Define ecosystem restoration and explain its importance;
- Outline the types of ecosystems and ecosystem services;
- Understand the steps and activities involved in developing a plan for ecosystem restoration;

- Conceptualise the application of the Short-Term Action Plan on Ecosystem Restoration in your context

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Critically evaluate and apply scientific knowledge and skills in the development and implementation of practical solutions to marine restoration strategies;
- Plan, execute and report on a project involving original research in laboratory and field settings;
- Involve stakeholder participation with inclusive communication, skills and gender-responsive planning, being critical to the restoration project.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Plan and implement a restoration programme in several marine and coastal habitats;
- Select the main criteria for establishing the success of restoration projects.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lecturers	10	20h
Fieldwork	1	4h
Project	4	10h
Semlnars	2	6h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	2h	30-50%

Classwork	10h	0-20%
Case study take home	35h	10-30%
Oral presentation	2h	0-10%
Fieldwork	4h	0-10%

Assessment Criteria:

- Written examination of the theoretical contents.
- Attendance and participation in class and the field sessions.
- Report and oral presentation

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)*

Ash, C. (2009). Assessing Ecological Restoration. *Science*, 325, 1045-1045. https://doi.org/10.1126/SCIENCE.325_1045E.

Benayas, J., Newton, A., Diaz, A., & Bullock, J. (2009). Enhancement of Biodiversity and Ecosystem Services by Ecological Restoration: A Meta-Analysis. *Science*, 325, 1121 - 1124. <https://doi.org/10.1126/science.1172460>.

McAfee, D., Reis-Santos, P., Jones, A., Gillanders, B., Mellin, C., Nagelkerken, I., Nursey-Bray, M., Baring, R., Silva, G., Tanner, J., & Connell, S. (2022). Multi-habitat seascape restoration: optimising marine restoration for coastal repair and social benefit. 9. <https://doi.org/10.3389/fmars.2022.910467>.

Timpane-Padgham, B., Beechie, T., & Klinger, T. (2017). A systematic review of ecological attributes that confer resilience to climate change in environmental restoration. *PLoS ONE*, 12. <https://doi.org/10.1371/journal.pone.0173812>.

To be determined by the lecturers teaching the course.

SBE337-P3 Geopolitics in the Arctic

Course name: Geopolitics of the Arctic			
Course Code: SBE337-P3			
Field(s)/area(s) of study: Arctic studies, politics and geopolitics, international relations, history, geography			
University coordinating the course: Nord University			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (potential)			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course explores critical geopolitics and the Arctic region, developing a nuanced understanding of the unique context for Arctic geopolitics across space and time. Many of the key issues in the Arctic maritime concern the (geo)political challenges of solving environmental issues with links to economic globalisation. This includes reflecting on the Arctic's long-term geopolitical history, vertical versus horizontal geopolitics and normative dimensions including justice, sustainable development and exceptionalism. The geopolitics of the Arctic helps us to better understand factors influencing the environmental and governance challenges of Arctic maritime spaces.			
Course Content: <ul style="list-style-type: none">• Definitions, Theories and Approaches to "Geopolitics"• The Long History of Arctic Geopolitics			

- Trends in Arctic Geopolitics literature
- Horizontal and Vertical Geopolitics
- Geopolitics, Environmental and Governance Challenges in Maritime Spaces
- Normative questions in Arctic geopolitics

Keywords: Arctic, critical geopolitics, maritime challenges

Programme Learning Outcomes (PLOs)

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *Demonstrate good knowledge of Arctic Geopolitics, and can describe the long-term trends and influences in the evolution of rules and norms linked to governance over Arctic spaces and the impacts of these on contemporary challenges in the Arctic maritime.*
- *Use their basic understanding of theories and approaches in geopolitics and discuss up to date knowledge of the trends in Arctic geopolitics within the themes covered in this subject.*
- *Acquire and demonstrate empirical and theoretical knowledge of norms, geopolitics as well as governance and environmental challenges in the Arctic.*
- *Demonstrate good knowledge of Arctic geopolitics and geopolitical dimensions across time and space with the ability to critically evaluate geopolitical narratives*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Do an analysis of critical geopolitics and issues in the Arctic region, based on empirical data and theoretical concepts.
- Use, gather, organise, develop, analyse and present research-based knowledge to answer assigned problems.
- Discuss the various implications of Arctic maritime challenges in the context of Arctic geopolitics and governance structures.
- Carry out English-language studies

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Reflect on their own learning practices and performance, as well as receive and benefit from guidance.
- Demonstrate the ability to manage their own learning processes effectively, including being prepared for lectures and seminars, staying up-to-date with the course reading and submitting work on time.
- Demonstrate independence in choosing a final paper topic, preparing a research plan, identifying relevant materials and carrying out the research process.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	16	1 hour (total: 16 hours)
Seminars	16	1 hour (total: 16 hours)
Project Presentation	1	5 hours (total: 5 hours)
Small Group assessment tutorials	1	3 hours (total: 3 hours)
Total teaching contact hours:	40 hours	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Concept maps	1 hour each x 16 =16 hours	15%

Annotated Bibliography	Annotations of articles included in course reading. 30 mins per annotation x 30 = 15 hours	15%
Final Essay plan	5 hours	10%
Oral presentation of 5-8 minutes of final essay	5 hours	10%
Final essay	3000 words	50%

Assessment Criteria:

Concept maps

- Is the concept map ready before the topic's seminar?
- Is the concept map visually clear and easy to read?
- Does the concept map cover all the essential aspects of the topic?
- Does the concept incorporate insights from all the relevant course material and seminar discussions?
- Does the student provide reflective commentary or annotations to explain their logics?
- Are references to external sources or additional resources included?
- Does the concept map align with the learning objectives of the course?

Annotated bibliography

- Are there annotations for every required course reading?
- Are there annotations for any additional recommended reading?
- Does each annotation provide a concise summary or overview of the source's main arguments and findings?
- Does the annotation refer to theories, data sources and/or methodology of the source?
- Are the annotations clear, well-written and organised?
- Do the annotations go beyond description to provide insightful analysis or interpretation of the sources?
- Do the annotations demonstrate critical thinking skills in evaluating and discussion the sources?

Final Essay Plan

- Does the essay plan contain a research statement or a hypothesis appropriate to the assignment?
- Does the essay plan use a clear structure with an introduction, main body (with at least 3 main points) and conclusion?

- Does the essay plan identify appropriate theoretical approaches, concepts, empirical examples and resources to support their hypothesis or claims?
- Does the essay plan demonstrate student has understood the learning objectives of the course?
- Does the essay plan adhere to all formatting guidelines, including page length, margins, font, etc.

Oral presentation

- Is the presentation appropriate and in agreement with the planned final essay topic?
- Is the presentation well-structured with a clear introduction, body and conclusion?
- Does the presenter adhere to the allotted time for presentation?
- Are visual aids well-designed and used effectively to support and handle the presentation?
- Does the presentation demonstrate the students understanding of their planned essay topic?
- Is the student able to handle questions or challenges from the audience that demonstrate their knowledge of the topic?

Final Essay

- Does the final essay contain a research statement or a hypothesis in the first paragraph appropriate to the assignment?
- Does the final essay have a clear structure with an introduction, main body and conclusion?
- Does the final essay demonstrate a clear hierarchy and clarity of concepts and balance between breadth and depth of coverage in the topic discussion?
- Does the final essay adhere to all formatting guidelines, including page length, margins, font, etc.
- Does the final essay demonstrate that the student has met the learning objectives of the course?

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)*

Geopolitics

Dodds, K. (2014) Chapter 1: What is Geopolitics?. Geopolitics: A Very Short Introduction. Oxford University Press, Oxford.

Agnew, J. (2004) Geopolitics. Routledge, London.

Ó Tuathail, Gearóid. (1996) Chapter 1: Geopolitics. *Critical Geopolitics: The Politics of Writing Global Space*. London: Routledge.

Ó Tuathail, Gearóid. (1996) Chapter 2: Geopolitics. *Critical Geopolitics: The Politics of Writing Global Space*. London: Routledge.

Agnew, J. (1994). The territorial trap: The geographical assumptions of international relations theory. *Review of International Political Economy*, 1(1), 53–80. <https://doi.org/10.1080/09692299408434268>

Long history of Arctic Geopolitics

Tamnes, Rold and Holtsmark, Sven G, Chapter 2: The Geopolitics of the Arctic in Historical Perspective in Tamnes, R., & Offerdal, K. (Eds.). (2014). *Geopolitics and Security in the Arctic: Regional dynamics in a global world* (1st ed.). Routledge. <https://doi.org/10.4324/9781315813455>.

Chaturvedi, Sanjay. Arctic Geopolitics: Then and Now in Nuttall, Mark, and T. V. Callaghan, eds. 2019. *The Arctic : Environment, People, Policy*. First edition. London: Routledge. <https://www.taylorfrancis.com/books/e/9780429340475>.

Roucek, Joseph S. 1983. "The Geopolitics of the Arctic." *The American Journal of Economics and Sociology* 42 (4): 463–71. <https://doi.org/10.1111/j.1536-7150.1983.tb01733.x>.

Bloom ET. Establishment of the Arctic Council. *American Journal of International Law*. 1999;93(3):712-722. doi:10.2307/2555272

Rottem, Svein Vigeland. *The Arctic Council : Between Environmental Protection and Geopolitics*, Springer Singapore Pte. Limited, 2019.

Carol Dyck, On thin ice: The Arctic Council's uncertain future, *Marine Policy*, Volume 163,

2024, <https://doi.org/10.1016/j.marpol.2024.106060>

Andreeva, S., & Rottem, S. V. (2024). How and why the Arctic Council survived until now – an analysis of the transition in chairship between Russia and Norway. *The Polar Journal*, 1–18. <https://doi.org/10.1080/2154896X.2024.2342111>

Trends in Arctic Geopolitics literature

Patriarche, V. H. "The Strategy of the Arctic." *International Affairs* (Royal Institute of International Affairs 1944-) 25, no. 4 (1949): 466–74. <https://doi.org/10.2307/3018422>.

Dodds, K. (2010) Flag Planting and Finger Pointing: The Law of the Sea, the Arctic and the political geographies of the outer continental shelf *Political Geography* 29(2) 63-73.

Bravo, M. and Rees, G. (2006) Cryo-politics: Environmental Security and the Future of Arctic Navigation *Brown Journal of World Affairs* 13(1) 205-215.
<https://www.jstor.org/stable/24590654>

Powell, R.C. (2008) Configuring an 'Arctic Commons'? *Political Geography* 27(8) 827-832.

Horizontal and Vertical Geopolitics

Rothwell, Donald R. 2014. "The Polar Regions and the Law of the Sea." In *Polar Geopolitics?*, edited by Richard C. Powell and Klaus Dodds. Edward Elgar Publishing. <https://doi.org/10.4337/9781781009413.00009>.

Jon Rahbek-Clemmensen (2015) Carving up the Arctic: The Continental Shelf Process between International Law and Geopolitics. *Arctic Yearbook*.

Coates, K.S., Holroyd, C. (2020). Introduction: Circumpolar Dimensions of the Governance of the Arctic. In: Coates, K.S., Holroyd, C. (eds) *The Palgrave Handbook of Arctic Policy and Politics*. Palgrave Macmillan, Cham.
https://doi.org/10.1007/978-3-030-20557-7_1

Casi, Corinna. 2018. "The Value of the Barents Region: More than a Resource Provider." In *Human and Societal Security in the Circumpolar Arctic*, edited by Kamrul Hossain, Jose Miguel Roncero Martin, and Anna Petrétei, 143–64. Brill | Nijhoff. https://doi.org/10.1163/9789004363045_008.

Pincus, R. (2020). Towards a New Arctic: Changing Strategic Geography in the GIUK Gap. *The RUSI Journal*, 165(3), 50–58.
<https://doi.org/10.1080/03071847.2020.1769496>

Stephenson, S. R. (2018). Confronting Borders in the Arctic. *Journal of Borderlands Studies*, 33(2), 183–190.
<https://doi.org/10.1080/08865655.2017.1302812>

Wood-Donnelly, Corine (2024): Sovereignty Cubed: The Arctic as a Territorial and Ontological Volume. *European Journal of Social Theory*. (In press)

Heininen, Lassi. 2014. "Northern Geopolitics: Actors, Interests and Processes in the Circumpolar Arctic." In *Polar Geopolitics?*, edited by Richard C. Powell and Klaus Dodds. Edward Elgar Publishing.
<https://doi.org/10.4337/9781781009413.00023>.

Wilson, G.N. (2020). Indigenous Internationalism in the Arctic. In: Coates, K.S., Holroyd, C. (eds) *The Palgrave Handbook of Arctic Policy and Politics*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-20557-7_3

Østerud, Øyvind, & Hønneland, G. (2014). Geopolitics and International Governance in the Arctic. *Arctic Review on Law and Politics*, 5(2).
<https://doi.org/10.23865/arctic.v5.1044>.

Koivurova, Timo, Sanna Kopra, Marc Lanteigne, Matti Nojonen, Malgorzata (Gosia) Smieszek, and Adam Stepień. 2020. "China's Arctic Policy." In *Chinese*

Policy and Presence in the Arctic, edited by Timo Koivurova and Sanna Kopra, 25–41. Brill. https://doi.org/10.1163/9789004408425_004.

Geopolitics, Environmental and Governance Challenges in Maritime Spaces

Dittmer, Jason, Sami Moisio, Alan Ingram, and Klaus Dodds. 2011. "Have You Heard the One about the Disappearing Ice? Recasting Arctic Geopolitics." *Political Geography* 30 (4): 202–14. <https://doi.org/10.1016/j.polgeo.2011.04.002>.

Wood-Donnelly, Corine, and Marianne Pascale Bartels. 2022. "Science Diplomacy in the Arctic: Contributions of the USGS to Policy Discourse and Impact on Governance." *Polar Record*. <https://doi.org/10.1017/S0032247422000134>.

Wood-Donnelly, Corine. 2016. "From Whale to Crude Oil: Lessons from the North America Arctic." *Energy Research & Social Science* 16: 132–40.

Arnold, S. R., K. S. Law, C. A. Brock, J. L. Thomas, S. M. Starkweather, K. von Salzen, A. Stohl, et al. 2016. "Arctic Air Pollution: Challenges and Opportunities for the next Decade." *Elementa-science of the anthropocene*. Oakland, Univ california press. <https://doi.org/10.12952/journal.elementa.000104>.

Dawson, J., M. E. Johnston, and E. J. Stewart. 2014. "Governance of Arctic Expedition Cruise Ships in a Time of Rapid Environmental and Economic Change." *Ocean & coastal management*. Oxon, England: Elsevier Cci Ltd. <https://doi.org/10.1016/j.ocecoaman.2013.12.005>.

Wood-Donnelly, Corine. 2022. "Iceberg Sovereignty." *Marine Policy* 143 (September): 105139. <https://doi.org/10.1016/j.marpol.2022.105139>.

Chuffart, Romain, Aaron M. Cooper, Corine Wood-Donnelly, and Laura Seddon. 2023. "Old Sea, New Ice: Sea Ice Geoengineering and Indigenous Rights in Arctic Ocean Governance." *The Polar Journal* 13 (2): 195–215. <https://doi.org/10.1080/2154896X.2023.2269688>.

Jeffers, Jennifer. 2010. "Climate Change and the Arctic: Adapting to Changes in Fisheries Stocks and Governance Regimes." *Ecology Law Quarterly* 37: 917.

Min, Pan. 2017. "Fisheries Issue in the Central Arctic Ocean and Its Future Governance." *The Polar Journal* 7 (2): 410–18. <https://doi.org/10.1080/2154896X.2017.1396000>.

Normative questions in Arctic geopolitics

Skorstad, Berit. 2023. "Sacrifice Zones: A Conceptual Framework for Arctic Justice Studies?" In *Arctic Justice*, edited by Corine Wood-Donnelly and Johanna Ohlsson, 96–108. Bristol University Press. <https://doi.org/10.56687/9781529224832-012>.

Wood-Donnelly, Corine. 2023. "Responsibility of and for Structural (In)Justice in Arctic Governance." In *Arctic Justice*, edited by Corine Wood-Donnelly and Johanna Ohlsson, 21–35. Bristol University Press.
<https://doi.org/10.51952/9781529224832.ch002>.

Wood-Donnelly, Corine. 2024. "Perspectives from the Top: Justice, IR and the Political Geography of the Arctic." In *Researching Justice; Engaging with Questions and Spaces of (In)Justice through Social Research*, edited by Agatha Herman and Joshua Inwood. Bristol: Bristol University Press.
<https://bristoluniversitypress.co.uk/researching-justice>.

Arruda, Gisele M., and Sebastian Krutkowski. 2017. "Social Impacts of Climate Change and Resource Development in the Arctic: Implications for Arctic Governance." *Journal of Enterprising Communities: People and Places in the Global Economy* 11 (2): 277–88. <https://doi.org/10.1108/JEC-08-2015-0040>.

Wood-Donnelly, Corine. 2023. "Evaluating Normative Capacity through Arctic Environmental Governance." *Climatic Change* 176 (9): 127.
<https://doi.org/10.1007/s10584-023-03603-3>.

Resource Development in the Arctic: Implications for Arctic Governance." *Journal of Enterprising Communities: People and Places in the Global Economy* 11 (2): 277–88. <https://doi.org/10.1108/JEC-08-2015-0040>.

Wood-Donnelly, Corine. 2024. "Negotiating the Arctic: Sustainability, Governance and Environmental Justice." *The Fletcher Forum of World Affairs* 48 (1). <https://www.fletcherforum.org/s/Negotiating-the-Arctic-Sustainability-Governance-and-Environmental-Justice.pdf>.

Gjørsv, Gunhild Hoogensen, and Kara K Hodgson. 2019. "'Arctic Exceptionalism' or 'Comprehensive Security'? Understanding Security in the Arctic." *The Arctic Yearbook*.
https://arcticyearbook.com/images/yearbook/2019/Scholarly-Papers/11_AY2019_Hoogensen_Hodgson.pdf.

Käpylä, J., Mikkola, H. (2019). Contemporary Arctic Meets World Politics: Rethinking Arctic Exceptionalism in the Age of Uncertainty. In: Finger, M., Heininen, L. (eds) *The GlobalArctic Handbook*. Springer, Cham.
https://doi.org/10.1007/978-3-319-91995-9_10

SBE338-P3 Arctic leadership

Course name: Arctic Leadership			
Course Code: SBE338-P3			
Field(s)/area(s) of study: Leadership, with focus on Arctic Leadership			
University coordinating the course: Nord University			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 95 % Online 5 %	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>This course aims to contribute to a greater understanding of the future of leadership. Arctic leadership is a course that delves into the future of leadership by examining the unique challenges and trends prevalent in the Arctic. Operating as a laboratory for future leadership, the Arctic serves as an early indicator for the impact of environmental, social, and economic changes on the world. With an abundance of natural resources but a diminishing population, Arctic leaders recognize the need to tap into the inherent potential of each individual, embracing the concept of "no waste" in human resources. The course provides students with knowledge on how to create such engagement in organizations. The course also provides students with knowledge on how Arctic leaders uses the cultural foundation rooted in adaptability and flexibility (due to the region's unpredictable conditions, to create adaptable and transformative organizations. The students will also learn how Arctic leaders navigate various paradoxes, maintain international connections, prioritize social sustainability, foster cooperation through dialogue</p>			

and consensus, employ humor and direct communication, foster a sense of belonging and Arctic identity, emphasize equality, trust, solidarity, reciprocity, openness, autonomy, and care, all while prioritizing engagement and well-being to enable prosperous development and contribute to the growth of Arctic societies.

Course Content:

The following topics will be covered:

- Challenges and opportunities in the Arctic and beyond
- Sustainable leadership in the Arctic and beyond
- Engaging leadership in the Arctic and beyond
- Dialogue based leadership in the Arctic and beyond
- Trust – based leadership in the Arctic and beyond
- Change and innovation leadership in the Arctic and beyond
- The danger of destructive leadership in the Arctic and beyond
- Arctic leadership and the future of leadership

The course also includes stakeholder dialogue/fieldwork, in addition to lectures and students' presentations.

Keywords: Arctic, leadership, Environmental-, social, and economic sustainability, resilience, change, trends, engagement, motivation, innovation.

Programme Learning Outcomes (PLOs)

By the end of the program, participants will, through the focus on Arctic Leadership, have gained a comprehensive understanding of the challenges and opportunities leaders of the future need to address, and how to address them, to mitigate and take advantage of the environmental, social and economic changes and trends Arctic leaders are facing. They will also have developed the skills and knowledge needed to engage in informed discussions and decision-making related to both the future of the Arctic, and the future of leadership.

The course contributes to the following PLOs:

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student:

- has broad knowledge on building socio-economic resilient organizations and communities, through sustainable Arctic Leadership approaches.
- has knowledge of sustainable development, leadership- managerial and governance practices in the Arctic, and the future of leadership.
- has knowledge about the need to, and how to increase engagement in organization
- understands the paradoxes and solutions for sustainable leadership related to Arctic leadership, and the future of leadership.

2. **Skills** (know-how): Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).

By the end of the course the student will be able to:

- apply concepts from the course on relevant leadership challenges and opportunities in the Arctic and beyond
- reflect upon own academic practice and convey this in a way that is relevant for the subject matters.
- present well-substantiated arguments in discussions of the subject, and draw on relevant leadership theories and approaches.
- analyse text from the most common academic sources and the media
- plan and carry out assignments and presentations related to the topics of the course.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- convey central academic issues like theories and research results regarding the impacts of Arctic leadership, and the future of leadership.
- apply the accumulated knowledge for writing a Bachelor thesis within the subject of the course.
- know about new perspectives and dilemmas in the field of Arctic leadership and the future of leadership

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	8	27h
Stakeholder dialogue/ Fieldwork	2	13h
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Report	100 %
Assessment Criteria		
Study materials/Course literature: <u>Obligatory literature:</u> Nord, Douglas, C, eds. (2019). «Leadership for the North: The Influence and Impact of Arctic Council Chairs». Springer. Mineev, A; Bourmistrov, A; Mellemvik, F. eds. (2023). "Global Development in the Arctic International Cooperation for the Future". Routledge. <i>Hand-outs and reader; links to relevant websites; recommended (optional) literature, etc.</i>		

SBE339-P3 Human Impact in the Arctic

Course name: Human development and impact in the Arctic			
Course Code: SBE339-P3			
Field(s)/area(s) of study: Social science with focus on environment, social and economic development, welfare and indigenous studies. Overlap with Circumpolar studies.			
University coordinating the course: Nord University			
Participating universities: SEA-EU partner Universities			
Total ECTS	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 82% Online 18%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course aims to contribute to a greater understanding of the complexity of Arctic regions, its socio-ecological system and the key environmental and climate challenges resulting from human impact in these areas, and a vision for a blue economy and sustainable development. The course provides students with knowledge on how industrial expansion and resource extraction rises questions on local well-being, indigenous people rights and sustainability of operations. Resource management, environmental governance and transdisciplinary research principles, which can contribute to a sustainable and responsible resource base for future settlements in the region, will be emphasized.			

Course Content:

The sub-topics covered relate to the following:

- Industrialisation and resource extraction
- Climate change and environmental problems
- Marine waste and Circular economy
- Different knowledge systems
- Areal conflict, human rights, and justice
- Resource management and governance
- Adaptation and resilience
- Management of ship traffic and port activities
- Future Arctic and Blue Growth

These are provided through lectures, fieldworks, webinars, stakeholder dialogue, and students presentations.

Keywords: Arctic, socio-ecological system, economic development, impacts, pollution, climate change, environmental governance.

Programme Learning Outcomes (PLOs)

By the end of the course, participants will have gained a comprehensive understanding of the complex interactions between human activities and the environment (connected to **PLO2** and **PLO10**). They will also have developed the skills and knowledge needed to engage in informed discussions and decision-making related to the future of the Arctic.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student:

- *has broad knowledge on Arctic socio-ecological system, economic development, climate change impacts, environmental problems.*
- *has knowledge about the central social science approaches to understand and address the impacts of human development in the Arctic.*
- *has knowledge of sustainable development, management practices and environmental governance*
- *understands the paths, dilemmas, and conflicts, associated with Blue Growth in the Arctic region.*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- apply concepts from the course on relevant human development trends in the Arctic.
- reflect upon own academic practice and convey this in a way that is relevant for the subject matters.
- present well-substantiated arguments in discussions of the subject, and draw on general social science theory and approaches.
- analyse text from the most common academic sources and the media

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- plan and carry out assignments and presentations related to the topics of the course.
- convey central academic issues like theories and research results regarding the impacts of Arctic human development.
- apply the accumulated knowledge for writing a Bachelor thesis within the subject of the course.
- know about new perspectives and dilemmas in the field of Blue Growth in the Arctic

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	2	7 hours
Lectures	5	23 hours
Webinars	2	7
Stakeholder dialogue	1	3
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Annotated bibliographies		10%
Case study (group)		40%

Report (individual)		50%
Assessment Criteria: (to be developed prior the course)		
<p>Study materials/Course literature: hand-outs and reader; obligatory literature; links to relevant websites; short video clips; recommended (optional) literature.</p> <ol style="list-style-type: none"> 1. Adger, N. (2003). "Social Capital, Collective Action, and Adaptation to Climate Change." <i>Economic Geography</i> 79(4): 387-404. 2. AMAP (2017). "Adaptation Actions for a Changing Arctic: Perspectives from the Barents Area." Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway, pp xiv + 267. Chapters 1,3,and 6-9. 3. Calderwood C and Ulmer FA. (2023) The Central Arctic Ocean fisheries moratorium: A rare example of the precautionary principle in fisheries management. <i>Polar Record</i> 59(e1):1–14. https://doi.org/10.1017/S0032247422000389 4. Dale, B., Veland, S., & Hansen, A. M. (2019). Petroleum as a challenge to arctic societies: Ontological security and the oil-driven 'push to the north'. <i>The Extractive Industries and Society</i>, 6(2), 367-377. doi:https://doi.org/10.1016/j.exis.2018.10.002 5. Huntington, H. P., et al. (2023). "Effects of Arctic commercial shipping on environments and communities: context, governance, priorities." <i>Transportation Research Part D: Transport and Environment</i> 118: 103731. 6. Keskitalo, C., et al. (2011). "Adaptive capacity determinants in developed states: examples from the Nordic countries and Russia." <i>Regional Environmental Change</i> 11: 579–592. 7. Knol, M., & Arbo, P. (2014). Oil spill response in the Arctic: Norwegian experiences and future perspectives. <i>Marine Policy</i>, 50, 171-177. doi:https://doi.org/10.1016/j.marpol.2014.06.003 8. Lemos, M. C. and A. Agrawal (2006). "Environmental Governance." <i>Annual Review of Environment and Resources</i> 31(1): 297-325. 9. Nogueira, L. A., et al. (2021). "Conducting Research in a Post-normal Paradigm: Practical Guidance for Applying Co-production of Knowledge." <i>Frontiers in Environmental Science</i> 9. 10. Olsen, J., et al. (2020). "Marine litter: Institutionalization of attitudes and practices among Fishers in Northern Norway." <i>Marine Policy</i> 121: 104211. 11. Reed, M. S., et al. (2018). "A theory of participation: what makes stakeholder and public engagement in environmental management work?" <i>Restoration Ecology</i> 26. 12. TemaNord (2014). Arctic Human Development Report : Regional Processes and Global Linkages. Copenhagen, Nordisk Ministerråd. Chapters 3,4,7 and 10. 		
<p>Further information: "Stakeholder dialogue" is a game/role play where students are asked to discuss a problem statement by having different roles.</p>		

Pathway 4. Sustainable Port-Tourism Cities (UNIST)

SBE341-P4 Sustainable Shipping & Ports

Course name: Sustainable Shipping and Ports			
Course Code: SBE341-P4			
Field(s)/area(s) of study: Transport			
University coordinating the course: University of Split			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The course aims to provide a holistic overview of the most recent policy, regulations, innovations, and available tools in shipping and port governance, established as a response to growing environmental concerns. Sustainability in shipping has been established through the implementation of new technologies, environmental regulations, and standards aiming to reduce negative consequences of the industry related to harmful emissions, waste management, noise impacts, ballast water issues, and other challenges. In contrast, actions for greening the port management include renewable energy solutions introduction, environmental standards, ecologically differentiated port tariffs, implementation of the shore power supply technology, green concession policies, monitoring and measuring pollution tools, exploring the water pollution mechanisms, disposal of waste, and others.			

Course Content:

Lectures

- The fundamentals of maritime transportation. The importance of shipping for the international trade.
- Rising importance of ports and terminals. The role of ports in global supply chains.
- Environmental regulations and standards for decarbonization in shipping and ports. Current energy selection and utilization.
- Sustainable development and decarbonization.
- Environmental challenges, issues, and environmental footprint.
- Green ports and shipping. Green supply chain management.
- Energy transition. Contemporary ship technologies for decarbonization.
- Green port management. Green shipping corridors.

Seminar

- Case study – air, noise and water quality measurement in the port
- Case study – best practices in optimization of ship desing, selection of the routes and standards
- Case study – green port dues and tariff policy; waste management and ballast water issues
- Case study – using cold ironing technology for ships in ports
- Case study – LNG bunkering and logistical challenges of energy transition

Fieldwork

- Application/assessment of noise measurement equipment
- Application/ assessment of air quality measurement devices
- Water quality sampling and analysis
- Traffic activities measurement in the port area
- Using drones and cameras for environmental monitoring (and other equipment)

Keywords: geen ports and shipping, energy transition, environmental regulations and standards, ship technologies, green corridors, sustainable port management.

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Demonstrate a theoretical understanding of fundamentals and sustainability principles in shipping and port management.
- Elaborate on the fundamental concepts related to the sustainability issues and challenges within shipping and port industry.
- Understand the recent trends and regulatory framework, with special focus on environmental standards and incentivizes.
- Identify the sources of energy transition and contemporary fuels, along with technical requirements of ports and shipping.
- Comprehend decarbonization principles and greening process of shipping and ports.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Apply the theoretical knowledge, analysis and on-field techniques of the current best practices to actualize and rise importance of negative impacts in shipping and port business.
- Develop and implement monitoring projects of environmental implications of shipping and port activities.
- Design experiments related to application of green technologies for fieldwork purposes.
- Conduct real-time measurements and perform data collection and analysis to draw conclusions intended towards solving specific environmental issues.
- Disseminate the fundamental research findings from monitoring projects through available communication channels to diverse stakeholders.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Independently analyse and interpret the created dataset to identify trends and challenges in shipping and ports from the sustainability standard.
- Apply knowledge and skills acquired in the course to improve monitoring and suppression of the negative impacts in shipping and port business.
- Demonstrate sustainability principles in addressing environmental challenges related to the ports and shipping.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	10	2h (Total 20h)
Seminar	10	1h (Total 10h)
Fieldwork	5	1h (Total 5h)
Total teaching contact hours:	35h	
Self - study time	90h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	min 10 pages, max 25 pages	50%
Examination	1h	40%
Presentation	15 minutes	10%

Assessment Criteria:

The student must pass the exam and the assignment to receive the final grade.

Exam (40%) – Written or computer-assisted through digital platform

Presentation (10%) - Based on the outputs of the Assignment

Assignment (50%) - Minimum 10 pages, maximum 25 pages. Lecturer will provide feedback on draft versions of the assignment.

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)

Notteboom, T., Pallis, A., & Rodrigue, J.-P. (2022). *Port Economics, Management and Policy* (1st ed.). Routledge, New York.

Rodrigue, J.-P. (2024). *The Geography of Transport Systems* (6th edition). Routledge, New York.

DNV. *Maritime forecasts to 2050 – Energy Transition Outlook*. Høvik, Norway, 2023.

Delloite. *Europe's ports at the crossroads of transitions*, 2021.

ARUP. *Port energy supply for green shipping corridors*, 2022.

DNV. *Ports – Green gateways to Europe: 10 Transitions to turn ports into decarbonization hubs*. AR Arnhem, the Netherlands, 2020.

UNCTAD. *Review of Maritime Transport 2023*. United Nations Publications. New York, USA, 2023.

Royal Haskoning DHV. *The new energy landscape Impact on and implications for European ports*. Amersfoort, The Netherlands, 2022.

Global Maritime Forum. *The Next Wave: Green Corridors*, 2021.

SBE342-P4. Sustainable Coastal Tourism

Course name: Sustainable Coastal Tourism			
Course Code: SBE342-P4			
Field(s)/area(s) of study: Tourism			
University coordinating the course: University Split/University Nord			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h)		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The aim of the course is to provide understanding of tourism in coastal areas. Demand behaviour and destination resources are explained followed by examination of positive and negative tourism impacts with highlighting tourism seasonality as a key obstacle to sustainability. Basics of tourism destination management and marketing are presented. Down the line principles of sustainable tourism development are given together with fundamentals of strategic tourism planning.			
Course Content: Tourism demand motivation, push factors and trends Coastal and marine tourism (resources, characteristics and issues) Tourism impacts monitoring and measuring (economic, environmental, social and cultural)			

Sustainable tourism development (sustainability, carrying capacity and development analysis)

Tourism seasonality (definition, causes, impacts and strategies)

Tourism strategic planning (governance, tourism policy and strategy)

Tourism destination management and marketing (destination product development, experience design, smart tourism)

Keywords: coastal and marine tourism, tourism impacts, sustainability, destination management and marketing

Programme Learning Outcomes (PLOs)

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

Understand the concept of coastal tourism encompassing demand behaviour, destination resources and tourism impacts

Understand principles of sustainable tourism development

Understand destination management and marketing functions and methods

Understand the role and importance of planning and strategy making sustainable tourism destination development

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Identify tourism impacts

Develop a strategic analysis of the destination context

Use management and marketing concepts and techniques

Propose a sustainable tourism destination product

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

Think critically

Address sustainable development issues

Work individual and in teams

Communicate in oral and writing

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lecture	10	2,5
Seminar	10	1,5
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case study (take home)		100%
Assessment Criteria: Case study (written assignment) 100%		
Study materials/Course literature: Morrison, A. (2024) Marketing and management tourism destinations (3rd edition). Routledge Bramwell, B. (2004), <i>Coastal Mass Tourism, Diversification and Sustainable Development in Southern Europe</i> , Channel View Publications, Clevedon https://www.unwto.org/ https://wttc.org/		

SBE343-P4. Urban Economics

Course name: Urban Economics			
Course Code: SBE343-P4			
Field(s)/area(s) of study: Economics			
University coordinating the course: University of Split			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h)		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The main aim of the course is to assess and understand the main reasons which have led to urban growth, changes in urban structure and some typical socio-economic urban problems, with emphasis placed on sustainable coastal cities. The course combines economic, social and technical aspects of urban development.			
Course Content:			
City size. City growth.			
Decentralisation of economic activities.			
Coastal cities			
Urban transportation. Housing. Urban poverty and urban crime.			
Smart cities. Green cities.			

Modern challenges in urban economics.
Keywords: urbanism, sustainable urban development, coastal cities, smart cities, green cities
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.</p> <p>PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.</p> <p>PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.</p> <p>PLO4. Describe alternative economic approaches in addition to traditional economic analysis.</p> <p>PLO5. Identify the different economic actors and stakeholder groups in blue industries.</p> <p>PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.</p> <p>PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.</p> <p>PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.</p> <p>PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.</p> <p>PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.</p> <p>PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <p>To understand the main forces behind urban growth; agglomeration of economic activities and urban land use patterns, and to address contemporary urban phenomena</p>

To understand the location decisions of households and firms, and how these decisions cause the formation of cities of different sizes and structure

To identify the idiosyncratic attributes of coastal cities and how these influence their development

To understand the economic reasons for the decentralisation of economic activities and to critically assess the process of metropolitanisation

To assess, from an economic point of view, common urban problems, such as transportation, housing, urban poverty and urban crime

To understand modern urban processes and concepts of sustainable cities, smart cities and green cities

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Identify positive and negative impacts of urban growth

Assess the sustainability of urban functions

Use urban economics concepts and techniques

Propose smart and green city solutions

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

Observe and think critically

Understand modern urban development processes

Work independently and in teams

Communicate ideas clearly

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	10	2.5h x 10 (Total 25h)
Seminars	10	1.5h x 10 (Total 15h)
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case study (take home)		100%
Assessment Criteria: The results of the case study assignment account for 100% of the final grade		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> O'Sullivan, A., 2012. Urban Economics. 8th ed. New York: McGraw-Hill/Irwin. O'Flaherty, B., 2005. City Economics, London: Harvard University Press. Glaeser, E., 2011. Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier, New York: Penguin Books. https://www.smartcitiesworld.net/ https://www.imd.org/smart-city-observatory/home/		

SBE344-P4. Migrations & Coastal Populations

Course name: Migrations and Coastal Populations			
Course Code: SBE344-P4			
Field(s)/area(s) of study: Sociology and Cultural Studies			
University coordinating the course: University Split			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h)		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This interdisciplinary course explores the dynamics of migrations and coastal populations with a focus on their impact on public health and maritime management. Through the analysis of various migration aspects, students will examine how migration flows shape socio-economic, health, and environmental conditions in coastal areas. Special attention will be given to understanding the public health challenges faced by migrants, as well as strategies for managing their health needs and integration into coastal communities. Concurrently, the course will explore the role of maritime management in managing migration flows and their socio-economic impacts on coastal resources and infrastructure.			
Course Content: <ul style="list-style-type: none">• Introduction to Migrations and Coastal Populations.			

- Explore the various factors influencing migration flows, including economic, social, and environmental drivers, through case studies and analysis.
- Socio-Economic Impacts of Migration on Coastal Communities.
- Public Health Challenges and Strategies for Migrants.
- Delve into maritime policies and practices that influence migration flows, and analyse the management of migration-related challenges in coastal areas.
- Assess the environmental consequences of migration pressures on coastal ecosystems and explore conservation efforts and sustainable resource management practices.

Keywords: Migrations, coastal populations, public health, maritime management, socio-economic integration, environmental impact, infrastructure.

Programme Learning Outcomes (PLOs)

PLO1: Understand the fundamental dynamics of migrations and their implications for coastal populations, integrating insights from public health and maritime management perspectives.

PLO2: Recognize the socio-economic, health, and environmental factors influencing migration flows and their impact on coastal communities and ecosystems.

PLO3: Identify the public health challenges faced by migrants and coastal communities, and assess the health benefits and risks associated with migration.

PLO4: Develop a comprehensive understanding of sustainable practices and policies for managing migration and coastal populations, with a focus on promoting health and well-being.

PLO5: Understand the roles of various stakeholders, including governmental bodies, healthcare providers, NGOs, and local communities, in addressing migration-related issues in coastal areas.

PLO6: Apply interdisciplinary tools and methodologies to analyze and evaluate the impacts of migration on coastal populations, environments, and infrastructure.

PLO7: Demonstrate effective communication skills for engaging with diverse stakeholders and advocating for inclusive and sustainable approaches to managing migration and coastal populations.

PLO8: Develop strategies to address migration-related challenges while balancing the promotion of public health, socio-economic development, and environmental conservation in coastal regions.

PLO9: Critically assess existing policies and frameworks related to migration and coastal management, and propose evidence-based solutions for enhancing their effectiveness.

PLO10: Cultivate an ethical commitment to promoting the well-being of migrants and coastal communities, while respecting cultural diversity and environmental sustainability.

PLO11: Assess and manage risks associated with migration, including public health hazards, socio-economic disparities, and environmental degradation, to ensure the safety and mental well-being of all stakeholders involved.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

CLO1: Understand the theoretical frameworks and factual information related to migrations and coastal populations, integrating knowledge from public health and maritime management disciplines.

CLO2: Analyze the socio-economic, environmental, and public health dimensions of migration flows and their impacts on coastal communities, aligning with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA).

CLO3: Apply disciplinary knowledge and skills to assess and address the public health challenges faced by migrants and coastal populations, ensuring alignment with applicable national qualifications framework(s).

CLO4: Demonstrate achievement in synthesizing interdisciplinary knowledge and competencies to develop sustainable strategies for managing migration and promoting well-being in coastal regions.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Utilize cognitive skills to analyse the socio-economic, environmental, and public health dimensions of migration flows and their impacts on coastal communities, developing evidence-based solutions for these challenges.
- Demonstrate practical skills in implementing interdisciplinary strategies for managing migration flows and promoting the health and well-being of migrants within coastal communities, while considering sustainable development practices.
- Apply creative thinking and problem-solving skills to develop innovative approaches for addressing the diverse needs of migrants and coastal populations, while ensuring alignment with disciplinary field(s) in public health and maritime management.

- Communicate effectively, both orally and in writing, to diverse stakeholders about migration-related issues and proposed solutions, demonstrating proficiency in communication skills.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Apply acquired knowledge and skills to analyze basic migration-related challenges and suggest potential solutions, adapting to various situations in coastal contexts.
- Contribute to decision-making discussions related to managing migration flows and supporting the well-being of migrants and coastal communities, considering ethical, cultural, and environmental dimensions.
- Exhibit independence in conducting basic research and gathering relevant data to inform evidence-based practices in migration management and public health promotion in coastal regions.
- Display initiative and collaboration skills in working with stakeholders from different sectors to address migration-related issues, demonstrating the ability to work both autonomously and responsibly towards common goals

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lecture	10	2h x 10s (total 20h)
Seminar	10	1h x 10s (total 10)
Fieldwork	10	1h x 10s (total 10)
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Case study (take home)		100%

Assessment Criteria: Case study (written assignment) 100%

Study materials/Course literature:

1. Goldenberg, S.M., Fischer, F. Migration and health research: past, present, and future. *BMC Public Health* 23, 1425 (2023). <https://doi.org/10.1186/s12889-023-16363-7>

2. Sandifer Paul A., Scott Geoffrey I. Coastlines, Coastal Cities, and Climate Change: A Perspective on Urgent Research Needs in the United States. JOURNAL Frontiers in Marine Science. Volume 8. 2021. <https://www.frontiersin.org/articles/10.3389/fmars.2021.631986>. DOI. 10.3389/fmars.2021.631986
3. Lincke D, Hinkel J. Coastal Migration due to 21st Century Sea-Level Rise. AGU Earth and Space Science. Volume 9. Issue 5. 2021. <https://doi.org/10.1029/2020EF001965>
4. Iglesias-Campos A, Meiner A, Bowen K, Ansong JO. Coastal Population and Land Use Changes in Europe: Challenges for a Sustainable Future. Elsevier. 2015. <https://doi.org/10.1016/B978-0-12-802748-6.00003-6>
5. WHO - Refugee and migrant health
6. ILO - Labour migration

SBE345-P4. Introduction to Marine Biotechnology

Course name: Introduction to Marine Biotechnology			
Course Code: SBE345-P4			
Field(s)/area(s) of study: biotechnology, aquaculture			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	NO (The course includes instruction and laboratory work in person)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Cell Biology and Biochemistry or equivalent		
Short course description: The course aims to show students the application of biotechnology to the study, management and (sustainable) exploitation of oceans. Marine habitats are overexploited and intensively modified so species are committed to adapt or irremediably face extinction. Blue biotechnology becomes a multidisciplinary field aiming to contribute to a sustainable exploitation of marine natural resources and to evaluate species/population extinction rates based on the species abilities to adapt to environmental changes and overfishing (among others). In this course students will learn to apply genomics (and other -omics) to the study of marine biodiversity, with special focus on the study of marine microbiome using metagenomics to identify species producing new natural products.			
Course Content: 1. Introduction to biotechnology			

- Biotechnology – definition and its historical development
- Current biotech industry and its major components
- Biodiversity of marine organisms and their potential in modern biotechnology

2. Aspects of bio-production

- Pre-treatment methods
- Isolation, harvesting, selection, optimization
- Bioreactors in marine biotechnology (e.g. fermentation)
- Valorisation and technology
- Sustainability and bioprocessing (e.g., small molecular metabolites)
- Aquaculture
- Marine manufacturing facilities (e.g., land-based aquaculture)

3. Compound isolation

- Compounds' isolation and purification
- Compounds' characterization (e.g., derivatization, X-ray analysis, NMR)
- Hyphenated chromatographic analysis (e.g., LC-MS/MS, GC, electrophoresis)

4. Activity assessment

- *In vitro* and *in vivo* bioactivity assessment (e.g. cytotoxicity, antibiotic activity, antifungal);
- Structure activity relationship (e.g., *in silico*)

5. Gene and protein technologies

- Genetics, genomics and other -omics
- Environmental DNA: sampling and markers
- Species identification: barcode of life, metagenomics, environmental DNA
- Genetic diversity: Climate change and adaptive genetics
- Organisms and marine products of interest in biotechnology
- Genetic and genomic improvement in aquaculture
- Chromosomal manipulation to obtain polyploids in fish and molluscs

6. Applications

6.1. Food, feed

6.2. Energy

6.3. Pharmaceuticals and supplements

6.4. Cosmetics and nutraceuticals

6.5. Biomaterials and construction

6.6. Bioremediation

6.7. Innovation and prospects of marine biotechnology

7. Bioethics and Biosafety

- Sustainability aspects and circularity (e.g., waste treatment)
- Environmental biosafety and regulations (e.g. Nagoya agreement);
- Intellectual Property Rights (IPR), patents, copyrights in blue biotechnology

Keywords: aquaculture, biotechnology, marine biodiversity, natural products, side streams upstream & downstream processing, valorisation, genetics

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations-

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge:

By the end of the course the student will be able to:

1. To know and understand basic concepts related to marine biotechnology;
2. To know the different groups of organisms of interest in Biotechnology, their biology and biotechnological exploitation;
3. To design and evaluate genetic improvement programs;

4. To evaluate extinction risk of species based on population genetics indexes (diversity and structure).

2. Skills (know-how):

By the end of the course the student will be able to:

1. To know and apply genetics and genomics for the study and sustainable exploitation of marine ecosystems.
2. To apply metagenomics for species identification.
3. To monitor marine biodiversity using environmental DNA techniques.

3. Autonomy & Responsibility: Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

1. apply some basic laboratory procedures
2. communicate with various biotech stakeholders
3. develop critical thinking and provide a rationale within biotech subject areas
4. know about the possibilities for the application of (marine) biological resources
5. know ethical, legal and societal aspects of biotechnologies

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.).

Method	Number of sessions	Duration
Labs	2	4h (Total 8h)
Lectures	10	2h (Total 20h)
Oral presentation	2	2h (Total 4h)
Seminar	2	2h (Total 4h)
Group Learning	2	2h (Total 4h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting, %
Oral examination (open questions)	30 min length of the exam per student	100%
Seminars (pass / fail)		0%
Labs (pass / fail)		0%
Oral presentations (pass / fail)		0%
Assessment Criteria: The assessment will be prepared as a portfolio that consists of an oral exam, two lab reports, oral presentations, and seminars <ul style="list-style-type: none"> - 100 % - Oral exam (30 min length / student) for grading A-F - Two lab reports (fail / pass); - Oral presentations (fail / pass); - Seminars (fail / pass) 		
Moodle/other: Learning materials (under construction), short articles – case studies, presentations for the course with updated videos, podcasts, movies. Any item can be selected as a mandatory source by the teacher. A suggested list of readings includes non-mandatory sources: <ul style="list-style-type: none"> ▪ Thieman, W.J. & Palladino, M.A. Introduction into Biotechnology, Pearson, 4th Global Edition, 2019, p.428. ▪ European Science Foundation, Marine Biotechnology: A New Vision and Strategy for Europe, Paper 15, September 2010, pp. 1-93. ▪ Rotter, A.. et al. (2021) The Essentials of Marine Biotechnology, Frontiers in Marine Science, 8, 629629. ▪ Uzochukwu et al. Biosafety and Bioethics in Biotechnology: Policy, Advocacy and Capacity Building, Routledge, 1st edition, 2022, p. 238. ▪ Collins J., Broggiato A., Vanagt T. (2018) Blue Biotechnology Chapter 2. In: Blue Growth and the New Maritime Economy, pp. 39-71. ▪ Zhang Y. et al. (2011) Bioreactor technology in marine microbiology: From design to future application, Biotechnology Advances, 29, pp. 312-321. ▪ Castle D. The Role of Intellectual Property Rights in Biotechnology Innovation, Edward Elgar Publishing, 1st edition, 2009, p. 480. ▪ Dewick P.M. Medical Natural Products: A biosynthetic approach, Wiley VCH, 2009, p. 550. ▪ Carroll, A.R. Marine Natural Products, Nat. Prod. Rep. 2023,40, 274-325, DOI ▪ https://doi.org/10.1039/D2NP00083K 		

- Romano, G., et al. Biomaterials and Bioactive natural Products from marine Invertebrates: From Basic research to Innovative Applications, *Marine Drugs*, 2022, 20, 210;
- Moghaddam et al. Recent highlights of biosynthetic studies on marine natural products, *Org. Biomol. Chem.* **2021**, 19, 123-140.
- Lu et al. Application of marine natural products in drug research, *Bioorg. Med. Chem.* **2021**, 35, 116058.
- Senadheera et al. Marine Bioactives and Their Application in the Food Industry: A Review, *Appl. Sci.* **2023**, 13, 12088

Inclusiveness: In this course, we ensure the equal treatment and diversity of all students through common oral presentations, laboratories, common seminars, and examination. All students have to introduce themselves to the students' community at the beginning of the course where all barriers will be removed. Students including minorities will be well integrated in study groups through random assignment of a lecturer.

Ethics: The ethical concerns are mostly referred to students who will attempt to perform interviews and surveys with the human participants-stakeholders. All ethical concerns will be resolved through the ethical committee if required.

SBE346-P4 Human Health & Physical Activity related to the Sea; Blue Sports

Course name: Human Health and Physical Activity in the Ocean – Blue Space 3 SB			
Course Code: SBE346-P4			
Field(s)/area(s) of study: Outdoor and Nature Education, Sport Sciences, Physical Education, Leisure Studies			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per 5 ECTS Credit	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Ability to swim		
Short course description:			
You have heard about Blue Space, Blue Mind & Hydrophilia? Maybe have joined the trend and gone for a “wild swim”? This course introduces two physical activities in the ocean (swimming and kayaking/canoeing) in both theory and practice. Those have the potential to improve mental and physical health and provide a sustainable connectedness to the surrounding nature.			
Course Content:			
<ul style="list-style-type: none">• Learning about the concepts of Blue Space, Blue Mind and Hydrophilia• Knowledge about effects on mental and physical health when doing physical activities in and on the sea			

- Theory and practice of Openwater swimming, cold water swimming and kayaking in the ocean.

Keywords:

Physical Activities in the Ocean

Blue Space & Blue mind, health and wellbeing

Hydrophilia, nature and sustainable leisure/living in the Arctic

Programme Learning Outcomes (PLOs): see overall programme description

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Know the basic ideas and facts behind the concepts of blue space, blue mind and hydrophilia.
- Have knowledge about hydrodynamics and other theory about swimming and human beings.
- Understand the meaning of water competence.
- Knows the most important challenges and dangers when swimming or kayaking in the ocean.
- Distinguish between types of cold-water swimming and the sport "Open water swimming" as represented by the World Aquatics.
- Have knowledge about nature in and around the ocean and how to behave responsible in the environment.
- Know the effects of sauna bathing in combination with cold water.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Practice Open Water swimming in the ocean with wetsuit adapted to her/his own level.

- Carry out ocean swimming in cold water without wetsuit in regard to her/his own swimming ability.
- Practise basic paddling techniques at sea and have basic skills in Friluftsliv by the sea.
- Experience mental and physical effects of being in and on the sea.
- Practice watercompetence including self-rescue as well as rescuing others with accessible rescue tools.
- Have basic skills in Friluftsliv by the sea, including clothing and equipment, orienteering and cooking on campfires.
- Show respect for the surrounding nature and behave "without traces"
- Combine cold water immersion with Sauna bathing in a healthy manner.
- Argue for the mental and physical health benefits.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Carry out an ocean swim in cold water related to the participants physical and mental abilities.
- Plan swimming activities in cold water including a risk analysis and regarding wellbeing.
- Guide other people in using cold water immersion and sauna bathing in a healthy way.
- Be able to reflect on how blue sports can be carried out in a sustainable manner, for different types of groups in an appropriate and safe way.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Fieldwork	Water basics in the pool	2 teaching hours
	Lifesaving outdoors	Half day
Fieldwork	Openwater swimming with neoprene suit/ wetsuit	One day
Fieldwork	Coldwater swimming & pre – and post activities for cws	One day
Fieldwork	Basic kayak techniques	One day
Fieldwork	Kayak trip on the sea	Two days
Total teaching contact hours:	40 h	
Self - study time	85 h	

Total Learning hours	125 h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting 50:50
Assignment 1		Reflective diary on experiences and learning from kayaking on the sea, and on how to apply competence in friluftsliv by the sea in a preferred pedagogical setting
Assignment 2		Presentation of recent research article about an appropriate topic from the course, both oral & written
Assessment Criteria: passed / not passed		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)		
Britton, E., Kindermann, G., Domegan, C., Carlin, C. (2018). Blue care: a systemtatic review of blue space interventions for health and wellbeing. <i>Health Promotion International</i> , 35, 50-69. https://doi.org/10.1093/heapro/day103		
Cracknell, D. (2019). By the Sea. The therapeutic benefits of being in, on and by the water. London: Aster		
Dowd, J., & Hoffmeister, F. (2015). <i>Sea Kayaking: The Classic Manual for Touring, from Day Trips to Major Expeditions</i> (Sixth edition.). Greystone Books.		
Foley, R., Kearns, R., Kistemann,T. (2019). Blue Space, Health and Wellbeing. London: Routledge		
Harper,M. (2022): Chill. The Cold Water Swim Cure. San Francisco: Chronicle Prism.		
Knechtle, B. Waskiewicz, Z. et al. (2020): Cold Water Swimming—Benefits and Risks: A Narrative Review», <i>Environmental Research and Public Health</i> . doi: 10.3390/ijerph17238984		
Nichols, W. (2014). <i>Blue Mind</i> . Back Bay Books.		
+ Handouts from the lectures		

SBE347-P4. Socio-economic & Environmental Monitoring

Course name: Socio-economic and Environmental Monitoring			
Course Code: SBE347-P4			
Field(s)/area(s) of study: Multidisciplinary			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery	Onsite 75% Online 25%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course provides an advanced exploration of socio-economic and environmental monitoring, emphasizing the integration of these domains within the context of the blue economy. It explores the interplay between social, economic, and environmental systems, and emphasizes the importance of monitoring and assessing these relationships to inform policy and decision-making. With a focus on coastal areas, students will delve into key principles, indicators, and real-world examples. Through lectures, discussions, and hands-on projects, students will develop the skills necessary to assess and monitor socio-economic and environmental factors in coastal regions.			
Course Content: Modules: Module 1: Principles of Socio-economic Monitoring			

- Overview of socio-economic monitoring frameworks and methodologies
- Analysis of key socio-economic indicators (e.g. Human Development Index, Sustainable Development Index)
- Product-oriented vs. process-oriented assessments

Module 2: Principles of Environmental Monitoring

- Overview of environmental monitoring frameworks and methodologies
- Analysis of key environmental indicators, including biodiversity, water quality, and climate change impacts
- Examples of environmental monitoring in coastal regions

Module 3: Interrelationships between Socio-economic and Environmental Systems

- Exploring the interactions between socio-economic and environmental factors
- Discussion on the relevance of integrated monitoring approaches
- Concepts of participatory and extractive assessments in different monitorings
- Case studies highlighting the interconnectedness of socio-economic and environmental monitoring systems in coastal regions
 - Data mining using open data sources (e.g., Eurostat, World Bank, Copernicus, European Environmental Agency)
 - Data extraction, analysis, and visualization for effective communication

Module 4: Blue Economy and Coastal Dynamics

- Understanding the concept of the blue economy and its components
- Examination of socio-economic and environmental dynamics in coastal regions
- Case studies highlighting the role of coastal areas in the blue economy

Module 5: Project Design and Implementation

- Group project assignment focusing on a specific coastal area scenario
- Guidance on project design, data collection, and analysis
- Designing experiments for socio-economic and environmental fieldwork
 - Identifying exact problems and defining ways to obtain new data
 - Methods such as focus groups and interviews for socio-economic data collection
 - Designing measurement campaigns for environmental data collection
 - Incorporating citizen science and VGI for data collection
 - Understanding the principles and benefits of citizen science

<ul style="list-style-type: none"> ▪ Techniques for engaging volunteers in data collection ▪ Utilizing VGI platforms and tools <ul style="list-style-type: none"> • Hands-on workshops on relevant data analysis techniques and visualization
<p>Keywords: Socio-economic Monitoring, Environmental Monitoring, Sustainable Development, Indicators, Data Collection Methods</p>
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.</p> <p>PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.</p> <p>PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.</p> <p>PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Demonstrate a theoretical understanding of socio-economic and environmental monitoring principles. • Explain key concepts related to the blue economy and the significance of coastal areas within this context. • Identify existing indicators, such as the Human Development Index or Sustainable Development Index, and their relevance in monitoring socio-economic and environmental factors. • Understand the concepts of participatory and extractive assessments and their applications in monitoring. • Comprehend the role and benefits of citizen science and VGI in data collection. <p>2. <u>Skills</u> (know-how): <i>Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> • Utilize advanced data compilation, analysis, and visualization techniques to address socio-economic and environmental challenges in coastal areas. • Design and implement monitoring projects focusing on coastal regions, integrating socio-economic and environmental data effectively.

- Conduct participatory and extractive assessments, both product-oriented and process-oriented.
- Design experiments for socio-economic and environmental fieldwork, including problem identification and data collection methods.
- Engage volunteers and use VGI platforms for data collection.
- Communicate findings and insights from monitoring projects to diverse stakeholders in the blue economy context.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Independently analyse and interpret multidisciplinary data to identify socio-economic and environmental trends and challenges in coastal areas.
- Apply knowledge and skills acquired in the course to contribute to sustainable decision-making processes in blue industries.
- Demonstrate ethical commitment and sustainability principles in addressing environmental and socio-economic problems related to the blue economy.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	10	2h (total 20h)
Practical Study-Unit	4	2h (total 8h)
Project	6	2h (total 12h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods:

Assessment methods include examination, project (written and presented by group) and portfolio.

Examination: written assessment (using traditional pen and paper or a digital platform for the administration of the examination) which is carried out in a predetermined, restricted time span under invigilated conditions.

Project: A collaborative or individual task requiring students to plan, execute, and present the results of an in-depth investigation or creative work related to the course.

Portfolio: Continuous assessment for all the exercises within the practical study-unit part, and group work summarized on a course Portfolio (each student must have their individual Portfolio which is the sum of their individual tasks and group works) -10%.

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination		40%
Project		50%
Portfolio (Continuous assessment for all the presence, activity and group work)		10%

Assessment Criteria:

Portfolio: Continuous assessment for all the exercises done and group work - 10%

Group Project Presentations - 50%

General Quiz - 40%

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)*

Course materials (lecture notes, data examples and exercises)

Artiola, J.F., Pepper, I.L. and Brusseau, M.L. eds., 2004. Environmental monitoring and characterization. Academic Press.

Goodstein, E.S. and Polasky, S., 2017. Economics and the Environment. John Wiley & Sons.

Glasson, J. and Therivel, R., 2013. Introduction to environmental impact assessment. Routledge.

Bennett, N.J., 2019. Marine social science for the peopled seas. Coastal Management, 47(2), pp.244-252.

Vanclay, F. (2003). International Principles For Social Impact Assessment. Impact Assessment and Project Appraisal, 21(1), 5–12.

<https://ec.europa.eu/eurostat>

<https://databank.worldbank.org/databases>

<https://iaia.org/best-practice.php>

SBE348-P4 Environmental Marketing & Social Awareness

Course name: Environmental Marketing and Social Awareness			
Course Code: SBE348-P4			
Field(s)/area(s) of study: marketing, business and management, marine ecology, environmental science			
University coordinating the course:			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course aims to apply marketing concepts and tools to environmental preservation and social awareness. The purpose of the course is to understand and manage the environmental sustainability challenges that companies face and the contributions of marketing to increasing their competitiveness from an eco-sustainable perspective. In particular, the course wants to provide theoretical and operational elements valuable in the strategic and operational management of marketing processes to enhance the green practices of manufacturing and service businesses.			
Course Content: Teaching Unit 1: Introduction to Environmental Marketing in the Blue Economy <ul style="list-style-type: none">The concept of environmental marketing, green marketing, sustainable marketing, and social marketing			

- Environmental challenges and current trends in the blue economy marketing
- Environmental factors - changes in the marketplace, local economies, global economy, geopolitics, technology, communication, demographics, socio-cultural values, business culture, and natural environment.
- Case studies: successful environmental marketing practices and marine industries

Teaching Unit 2: Fundamentals of Social and Environmental Awareness

- Definition and significance of social and environmental awareness in marketing
- Drivers of social and environmental awareness
- Impact of social and environmental awareness on businesses and industries
- Community and stakeholder engagement
- Role of social and ecological initiatives in promoting marine environmental consciousness
- Examples of impactful social and environmental awareness initiatives in the blue economy: Port cities and communities

Teaching Unit 3: Corporate Social Responsibility (CSR), and Sustainable Blue Economy

- Understanding CSR and its importance in marine and ocean-related industries
- How CSR initiatives influence consumer trust and loyalty in the blue economy
- Analysis of companies with effective CSR strategies in marine industries
- Cooperation, networking, and creating shared value in marine industries
- Case study: Aquaculture and CSR

Teaching Unit 4: Consumer Behaviour and Sustainable Blue Economy

- Key factors driving sustainable consumer behavior toward blue economy products and services
- Green consumption in marine contexts
- Methods for assessing consumer attitudes toward sustainability in the blue economy
- Case study: Aquaculture - Sustainable production and consumption

Teaching Unit 5: Marketing Strategies for Sustainable Products in the Blue Economy

- The green marketing mix (Product, Price, Place, Promotion) in marine industries
- Understanding eco-friendly products and services in the blue economy

- Case studies: Successful green marketing in port operations / aquaculture / nautical tourism / marine and ocean-related industries

Teaching Unit 6: Communication and Advertising in Environmental Marketing for the Blue Economy

- Crafting messages that highlight sustainability in marine contexts
- Utilizing social media and digital platforms for environmental campaigns in the blue economy
- Designing persuasive advertisements for eco-friendly marine products
- Case study: Eco-labeling the blue economy

Teaching Unit 7: Ethical Considerations in Environmental Marketing for the Blue Economy

- Addressing greenwashing and its consequences in marine industries
- Ethical frameworks and guidelines in environmental marketing for the blue economy
- Regulatory considerations and compliance in marine contexts
- Green marketing and ESG Reporting
- Case study: ESG Reporting in the blue economy industries (aquaculture, nautical tourism, port operation)

Teaching Unit 8: Implementing Environmental Marketing Campaigns in the Blue Economy

- Planning and executing a successful campaign in marine industries
- Collaboration with stakeholders and partners in the blue economy
- Tools for monitoring and evaluating campaign impact in marine and ocean-related contexts
- Case studies: Coastal and Port Cities – Environmental marketing and Sustainability (environmental, social and economic sustainability)

Keywords: Environmental awareness, Social Responsibility, Environmental Marketing, Green marketing, Ethical Marketing, Corporate Social Responsibility (CSR), Blue Economy

Programme Learning Outcomes (PLOs)

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats to the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Explain the fundamental principles of environmental marketing and social awareness in the blue economy.
- Describe the role of corporate social responsibility (CSR) in marine and ocean-related industries.
- Identify the key factors driving consumer behavior towards sustainable blue economy products.
- Analyze the impact of marketing strategies on environmental sustainability within the blue economy.
- Understand the ethical implications of environmental marketing and greenwashing in the context of marine industries.
- Recognize the regulatory frameworks and guidelines governing environmental marketing in the blue economy.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Implement marketing strategies that promote eco-friendly products in the blue economy.
- Propose effective communication campaigns to raise social awareness on environmental issues related to marine and ocean sustainability.
- Utilize digital and social media tools to enhance environmental marketing efforts in the blue economy.

- Apply data analysis techniques to measure the effectiveness of green marketing campaigns in marine industries.
- Create marketing plans that align with the principles of sustainability and CSR within the blue economy.
- Conduct marketing research related to the course content.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Independently, and working in a team, design and execute environmental marketing campaign focused on the blue economy.
- Critically evaluate the sustainability practices of various businesses in marine and ocean-related industries.
- Advocate for ethical marketing practices within organizations involved in the blue economy.
- Collaborate effectively with stakeholders to promote sustainable business practices in marine industries.
- Demonstrate leadership in promoting and implementing green marketing initiatives in the blue economy.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lecture	8	2h x 8s (Total 16h)
Seminar	8	12
Online learning (prerecorded sessions or online forum)	6	6
Group Projects: Collaborative projects where students create social awareness initiatives for marine contexts.	3	6
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Essay	2,000 words	50%
Students project	20 minutes	50%
Assessment Criteria		
<p>Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i></p> <p>Suggested textbooks:</p> <p><i>(Alphabetical)</i></p> <p>Bengtson, E. & Mossberg, O. (2023): The Virtues of Green Marketing, A Constructive Take on Corporate Rhetoric. Palgrave Macmillan</p> <p>Carvill, M. & Butler, G. & Evans, G. (2021): Sustainable Marketing: How to Drive Profits with Purpose. Bloomsbury Business</p> <p>Carvill, M. & Butler, G. (2024): Can Marketing Save the Planet? 101 Practical Ways to Use Sustainable Marketing as a Force for Good. Bloomsbury Business</p> <p>Charter, M., & Polonsky, M. J. (1999). Greener Marketing: A Global Perspective. Greening Marketing Practice (2nd ed.). Sheffield.</p> <p>Esakki, T. (2017): Green Marketing and Environmental Responsibility in Modern Corporations. IGI Global</p> <p>European Commission (2021): Sustainability criteria for the blue economy. Publications Office of the European Union</p> <p>European Commission (2012): Blue Growth Opportunities for marine and maritime sustainable growth, Publications Office of the European Union</p> <p>European Commission (2020). The EU Blue Economy Report. 2020. Publications Office of the European Union</p> <p>Grant, J. (2007). The Green Marketing Manifesto. John Wiley & Sons.</p> <p>Kirgiz, A. C. (2016): Green Marketing, A Case Study of the Sub-Industry in Turkey. McMillan Palgrave</p> <p>Kotler, P., & Lee, N. (2011): Social Marketing: Influencing Behaviors for Good. Sage Publications.</p> <p>Newman, N. (2021). Green Marketing: A Conceptual Overview. In: Mukonza, C., Hinson, R.E., Adeola, O., Adisa, I., Mogaji, E., Kirgiz, A.C. (eds) Green Marketing in Emerging Markets. Palgrave Studies of Marketing in Emerging Economies. Palgrave Macmillan</p>		

- Martins, A. (2021). SME Green Marketing. In: Adae, E.K., Kosiba, J.P.B., Hinson, R.E., Twum, K.K., Newman, N., Nutsugah, F.F. (eds) Responsible Management in Emerging Markets. Sustainable Development Goals Series. Palgrave Macmillan
- Nygaard, A. (2024): Green Marketing and Entrepreneurship. Springer
- Ottman, J. A. (2011): The New Rules of Green Marketing: Strategies, Tools, and Inspiration for Sustainable Branding. Berrett-Koehler Publishers.
- Peattie, K. (1995): Environmental Marketing Management: Meeting the Green Challenge, Financial Times Management
- Peattie, K., & Peattie, S. (2009): Social Marketing: A Pathway to Consumption Reduction? Journal of Business Research, 62(2), 260-268.
- Polonsky, M. J., & Rosenberger III, P. J. (2001): Reevaluating Green Marketing: A Strategic Approach. Business Horizons, 44(5), 21-30.
- Randle, P. & Eyre, A. (2023): Sustainable Marketing, The Industry's Role in a Sustainable Future, KoganPage
- UNESCO (2017): Education for Sustainable Development Goals Learning Objectives. UNESCO Education Sector, United Nations
- Winston, W. & Mintu-Wimsatt A. T. (1997): Environmental Marketing Strategies, Practice, Theory, and Research. Routledge

SBE349-P4 Coastal Resource Strategic Management

Course name: Coastal Resource Strategic Management			
Course Code: SBE349-P4			
Field(s)/area(s) of study: Interdisciplinary, Environmental Sciences, Environmental Protection Technology, Management and Administration, Geography, Economics.			
University coordinating the course: University Split			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
Coastal Resource Strategic Management deals with resource management issues and provides an in-depth analysis of the challenges facing the coastal environment and possible responses to these challenges, from the health of coastal ecosystems to sustainable development of coastlines. Students will examine how coastal resources can be sustainably managed to ensure the development of coastal communities while maintaining ecosystem health and creating economic prosperity. In addition to examining the theory, concepts, and framework of Integrated Coastal Zone Management (ICZM), examples of its practical application in the European Union and European regional seas as well as internationally will be analysed. The historical and current practises as well as the future of marine protection at local, regional, and international level			

will be discussed. The importance of the blue economy in the context of achieving the UN Sustainable Development Goals will also be discussed.

Course Content:

1. Introduction. The need for Integrated Coastal Zone Management ICZM
2. The development of ICZM
3. Fundamental concepts of ICZM
4. The rise of sustainability
5. Socio-economic issues. Institutional, legal, and financial considerations. The importance of public participation and consensus building. Top-down and bottom-up approach.
6. Environmental issues and environmental management
7. The role of science and the knowledge base
8. The value of coasts and oceans. Blue economy
9. The phases of ICZM: formulation, approval, implementation, operation, and evaluation of the ICZM programme
10. Management tools and techniques
11. ICZM in the EU
12. ICZM in the regional seas of the EU
13. Lessons learnt – examples of good practise 1
14. Lessons learnt – examples of good practise 2
15. Lessons learnt – examples of good practise 3

Keywords: coastal ecosystems, challenges, sustainability, blue economy. ICZM

Programme Learning Outcomes (PLOs)

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *understand and explain/argue the concept of integrated coastal zone management and related concepts (sustainability, blue economy, ecosystem services, ecosystem-based management, circular economy, zero-waste, social responsibility...)*
- *understand and explain/argue the principles of sustainable development*
- *understand and explain/argue the origin of environmental and socio-economic issues as well as to discuss the possible solutions including Nature-based Solutions*
- *understand and explain/argue the role and importance of ICZM in sustainable management of the coasts.*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *identify negative impacts of human activities in coastal zones*
- *apply management concepts and techniques to solve the problems*
- *critically evaluate the use of different management concepts and techniques*

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- *Communicate politely and affirmatively - orally and in writing*
- *Work individually and in teams – be able to argue on topics related to the subject studied and be open to different options*
- *Think critically – review and evaluate different concepts in relation to the topic studied*

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lecture	15	2h x 15 s (Total 30h)
Seminar	10	1h x 10s (Total 10)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Theoretical/problem-based essay and oral presentation	10 pages of essay and 10 to 15 minutes for the presentation (10 PPT slides)	25%
Written exam	45 minutes	75%
Assessment Criteria: Written essay and oral presentation 25% Written exam 75%		
Study materials/Course literature: <ul style="list-style-type: none"> Ahlhorn, F. 2018. ICZM, Springer Vieweg Wiesbaden, https://doi.org/10.1007/978-3-658-17052-3 or any other publication on ICZM! UNEP, 2021. GOVERNING COASTAL RESOURCES - IMPLICATIONS FOR A SUSTAINABLE BLUE ECONOMY https://www.unep.org/resources/publication/governing-coastal-resources-implications-sustainable-blue-economy UNEP/MAP Priority Actions Programme Regional Activity Centre (PAP/RAC) 2019 Common Regional Framework for Integrated Coastal Zone Management https://iczmplatform.org/storage/documents/Ab5KKfiwRSrOLYPvVRYdKBdr0GAKlOMx14KtOfRo.pdf https://www.paprac.org/iczm-protocol 		

Pathway 5. Blue Management: Accounting, Conservation and Restoration (UCA)

SBE351-P5. Policy, Legal & Regulatory Framework for Blue Management

Course name: Policy, legal and regulatory framework for Blue Management			
Course Code: SBE351-P5			
Field(s)/area(s) of study/areas of knowledge: International Law, Maritime Law, Fisheries			
University coordinating the course: UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
Policy, legal and regulatory frameworks are key to the planning and implementation of both management and business. "Marine and Maritime Governance, Laws and Regulations" are covered in a generic way in the first year (SBE 110). However, the specific framework for blue management is sufficiently relevant to be addressed in this subject. The course introduces the integration of sustainable development principles into the tourism sector. The course also recognizes the importance of fisheries and aquaculture as food security and economic growth. For this reason, it covers the international legislation with the aim to preserve fish stocks, protect the marine environment, and while ensuring the economic viability of the activity provide consumers with quality food. Fisheries and aquaculture policies form part of the country's broader maritime policy. Hence, any policy shall aim to ensure that the			

activities of the fishing and aquaculture sectors are environmentally sustainable in the long term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits.

Course Content:

Regulatory Framework of Blue Management and Ocean Governance (1 ECTS)

Institutional Framework

Marine-based activities

Marine-related activities

Regional Experiences

Regulatory Framework for Sustainable Tourism (1 ECTS)

Ports and marinas: Institutional Framework

Introduction to the legal regime of tourist activity. Liability

Tourism companies and nautical-sports tourism. The tourist as a consumer

Tourist and nautical-recreational contracts in general. Mooring agreement. Charter contracts

Regulatory Framework for Sustainable Fisheries and Aquaculture (3 ECTS)

International legal framework

The role of the Regional Fisheries Management Organisations

EU Common Fisheries Policy

Rights and responsibilities of States in fisheries governance

Illegal, unreported and unregulated (IUU) fishing

Strategic guidelines for sustainable and competitive aquaculture

Regulation of aquaculture production

EU welfare standards in aquaculture

Keywords: blue management, sustainable tourism, fisheries, aquaculture

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Have a general understanding of what is Blue management and its fundamental principles
- Understand the importance of the international legal and institutional frameworks for the sustainable tourism and fisheries/aquaculture
- Comprehend key legal and policy issues regarding tourism, fisheries and aquaculture
- Increase knowledge of the international law framework for fisheries governance
- Understand the importance of animal welfare regulation in aquaculture production

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Identify contemporary policy and legal issues relating to fisheries, aquaculture and tourism
- Identify the strengths and weaknesses of the current legal framework concerned with fisheries, aquaculture and tourism

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Recognize current and future challenges in blue management
- Apply knowledge to different/novel circumstances
- Contribute to current discussions on behalf of governments, NGOs or other stakeholders

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*) See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
--------	--------------------	----------

Lectures	40	60 min
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	5000 words	20%
Case study (take home)	2000 words	10%
Examination	2 hours	50%
Oral presentation	1 hour (0.3 hour per student)	20%
Assessment Criteria: Examination 70% and assignment 30%		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)		
Jonatan Echebarria Fernández, Tafsir Matin Johansson, Jon A. Skinner, Mitchell Lennan (eds.) <i>Fisheries and the Law in Europe. Regulation After Brexit</i> , Routledge, 2022		
Mary Ann Palma et al., <i>Promoting Sustainable Fisheries</i> , Martinus Nijhoff Publishers, Leiden-Boston, 2010		
Nigel Banks et al, <i>Aquaculture Law and Policy Global, Regional and National Perspectives</i> , Edward Elgar Publishing, 2016		
European Commission. (2021). <i>Strategic Guidelines for a More Sustainable and Competitive EU Aquaculture for the Period 2021 to 2030</i> .		
Naylor, R., Fang, S., & Fanzo, J. (2023). A global view of aquaculture policy. <i>Food Policy</i> , 116, 102422.		
Pavlidis, M., Papaharisis, L., Adamek, M., Steinhagen, D., Jung-Schroers, V., Kristiansen, T., Theodoridi, A., Otero Lourido, F. (2023). Research for PECH Committee – Animal welfare of farmed fish, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.		

Inclusiveness: The teaching activities in the course will be conducted in an inclusive manner – plenary lectures will be able to follow from distance, and group assignment planned in a gender-balanced way.

Ethics: Ethical considerations need to be part of the transdisciplinary research methodology

Environmental ethics

Food security

Animal well-being

SBE352-P5. Data Sources & Processing Tools for Blue Management

Course name: Data sources and processing tools for Blue Management			
Course Code: SBE352-P5			
Field(s)/area(s) of study/areas of knowledge (UCA): Applied Physics, Earth Sciences, Biology.			
University coordinating the course: University of Cadiz			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 100% Online 0%	Is it possible for students to follow the online sessions remotely?	No
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
The handling and assimilation of information from the growing digital repositories of ocean data is becoming one of the most in-demand skills. The open use of remotely sensed, field and model data is at the core of the main Earth Observation (EO) Programmes, such as Copernicus, and is a key aspect of blue management support. Some introductory aspects of data mining and assimilation are covered in several previous courses in the SBE Bachelor. The present course is intended to deepen the knowledge and use of model/data repositories, such as the Copernicus Marine/Land Services. Likewise, the course aims to build practical skills and enhance ability to process, present and interpret scientific data. To this end, students will be involved in practical exercises with advanced data analysis and visualisation tools, such as Python, Climate Data Operators (CDO), or Ocean Data View, and E/O tools for image processing, such as SNAP. Related 1st and 2nd year courses: Ocean Data Functioning (SBE102), Digital Data Compilation, Analysis and Visualisation			

(SBE202), Geographic Information Systems (SBE201), Remote Sensing: Databases and basic assimilation techniques (SBE207), Climate Change (SBE204).

Course Content:

The course content presented here is an advanced step forward of the foundations and practical skills of some of the related courses of 1st and 2nd years.

- Main repositories of ocean and atmospheric data (in-situ, remote sensing and model data).
- Basic concepts of metocean data: time-space resolution and coverage; processing levels; climatology, reanalysis and Near Real Time data.
- Basics of metocean data analysis.
- Practical hands-on sessions:

Installation and introduction to the working environment (Python, Climate Data Operators).

Python scripting: accessing, downloading, reading, plotting and data analysis.

Climate Data Operators.

Earth Observation tools for image processing (SNAP).

- Project development, presentation and defence.

Keywords: Earth Observation/model/in-situ Data Mining, Scripting, Data Analysis and Processing Tools.

Programme Learning Outcomes (PLOs)

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *Identify different types and formats of available E/O data and model data;*
- *Know and understand key advanced data assimilation and image processing tools and their characteristics.*

- Understand the basics of data processing and extraction of knowledge from data. This includes data conversion from different formats: ascii and NetCDF.
- Use of timely delivery of routine, reliable, quality-assured data assists in meeting expected standards of environmental monitoring, assessments and management in support of sustainable development.
- Understand how relevant data may be acquired to fit the needs of users involved in blue economy.
- Give appropriate importance to data to prove theoretical concepts and/or draw scientific conclusions.

2. **Skills** (know-how): Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).

By the end of the course the student will be able to:

- Apply the scientific method in the design of studies and assessments, in establishing feasible sampling and surveying protocols, in the correct interpretation of data, and in deriving meaningful conclusions.
- Handle several data sources (models, in-situ and remote sensing); different types of data (time series, gridded data, etc.); data formats (ascii, NetCDF).
- Gain practice in data processing and analysis through the use of various software packages.
- To source and use available scientific resources – using climatologies, catalogues and databases.
- Adopt data processing methodologies to prove scientific theories and/or draw conclusions on the basis of a dataset.
- Process and analyse scientific data using software typically used in oceanographic (and other types of scientific) research.
- Understand the data needs of environmental managers to perform coastal zone management using an ecosystem-based approach.

3. **Autonomy & Responsibility**: Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Decide the most appropriate data and processing tools to be used in specific real situations.
- Use the gained knowledge to transform data from physical variables to relevant information for third parties and users.
- Synthesise all the data information in key elements in the form of brief reports and short presentations.
- Present and discuss results.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.) See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
Lecture	14	1 hour (14 h.)
Practical Study Unit	12	2 hours (24 h.)
Performance/Project	1	2 hours (2 h.)
Total teaching contact hours:	40	
Self - study time	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Competencies		60%
Case Study (Take Home)		30%
Classwork		10%

Assessment Criteria:

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

SBE353-P5. Socio-ecological Monitoring

Course name: Socio-ecological monitoring			
Course Code: SBE353-P5			
Field(s)/area(s) of study/areas of knowledge (UCA): Ecology/Zoology/Botany			
University coordinating the course: UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 95% Online 5%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
<p>Scientific knowledge is the base for decision-making in management. Socio-ecological systems are highly dynamic and monitoring plans are indispensable to track the success or failure of the management actions. Managers must recognize the need for adaptive management, where goals must be regularly updated in the light of the monitoring programs and changes observed.</p> <p>This course provides an in-depth exploration of indicators and methods for socio-ecological monitoring, integrating the value of biological diversity and its socioeconomic impact. The course will focus on marine ecosystems and their main components.</p> <p>Key topics and activities include: Ecological and socioeconomic indicators. Design, methods and technology for in-situ monitoring plans. Response pattern of biological diversity to perturbations, including their socio-economic impact.</p>			

Cost and sustainability of long-term monitoring programmes. Monitoring field protocols.

The course would be partly developed through field-based activities in UCA facilities linked to the Institute of Marine Research (INMAR), such as La Esperanza Saltpans research facilities or the marine biodiversity monitoring station on the island of Tarifa (Strait of Gibraltar).

Related 1st and 2nd year courses: Marine Ecosystems and Biodiversity (SB101), Ocean functioning (SBE102)

Course Content:

Measuring Marine Biodiversity: Introduction to socio-ecological indicators (2h)

Policy-Relevant Marine Diversity Descriptors: Diversity descriptors for EU policies (1h)

Diversity Measurement Methods:

Benthic systems (2h)

Pelagic systems (2h)

Top predators/large vertebrates (2h)

Trophic Networks (Stella): Understanding food webs (2h)

Study Cases:

Marine litter impacts (2h)

Socioeconomic impacts of biological invasions (Student seminars, 3h)

Molecular Tools for Biodiversity Estimation (2h):

Introduction to molecular techniques

Barcoding

Next-Generation Sequencing

eDNA and metabarcoding

Citizen Science: Engaging public participation in management monitoring plans (1h)

International Monitoring Networks: Seminar on global biodiversity monitoring initiatives (1h)

Fieldwork/Lab Sessions:

Experimental design and sampling of benthic systems (4h)

Experimental design and sampling of pelagic systems (4h)

<p>Experimental design for invasive species (4h)</p> <p>Monitoring top predators (4h)</p> <p>Molecular techniques applied to biodiversity monitoring (4h)</p>
<p>Keywords: Biodiversity Assessment, Ecological Indicators, Diversity Measurement, Experimental Design, Sampling Techniques, Socio-Economic Impact, Biological Invasions, Litter pollution, Molecular Tools.</p>
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.</p> <p>PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.</p> <p>PLO3. Identify and interpret the challenges that come with the increase in the economic value of the oceans and the increasing threats to the oceans.</p> <p>PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.</p> <p>PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.</p> <p>PLO11. To understand the impact of socio-economic activities linked to the marine environment, focusing on sustainability.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge:</u> <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course, the student will be able to:</u></p> <p><i>Explain the importance and application of ecological indicators in measuring biodiversity.</i></p> <p><i>Describe the various diversity descriptors relevant to EU policies.</i></p> <p><i>Summarise the methods for measuring diversity in benthic, pelagic systems, and among top predators/large vertebrates.</i></p> <p><i>Understand the principles of trophic networks and their role in marine ecosystems.</i></p> <p><i>Discuss the socioeconomic effects of the impacts on marine ecosystems (marine litter and biological invasions).</i></p> <p><i>Outline molecular tools used in biodiversity estimation, including barcoding, Next-Generation Sequencing, and eDNA techniques.</i></p>

Recognize the significance of citizen science and international monitoring networks in biodiversity conservation.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course, the student will be able to:

Design and execute experimental plans for sampling and monitoring benthic and pelagic communities.

Develop strategies for monitoring invasive species and top predators.

Analyse and interpret data from biodiversity assessments.

Evaluate the effectiveness of different biodiversity monitoring methods.

Collaborate with peers in presenting seminar topics related to socioeconomic impacts of biological invasions.

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills independently in different situations.*

By the end of the course, the student will be able to:

Critically assess and select appropriate ecological indicators and diversity measurement methods based on specific research questions or conservation needs.

Apply theoretical knowledge to practical situations, such as addressing the impacts of marine litter and biological invasions.

Engage in self-directed learning by staying updated with advancements in biodiversity monitoring techniques and international best practices.

Demonstrate responsibility in conducting fieldwork and lab sessions, ensuring ethical and accurate data collection and analysis.

Participate proactively in citizen science initiatives, leveraging public engagement to enhance biodiversity monitoring efforts.

Independently prepare and deliver seminars on contemporary issues in marine biodiversity, demonstrating the ability to communicate scientific findings effectively.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	9	7 x 2h=14h 2 x 1h= 2h

Fieldwork	4	4 x 3h= 12h
Lab sessions	5	4x1h=4h (associated to Field Sessions) 1x4h=4h (molecular tools)
Seminar	2	1 x 2h= 2h (student seminars) 2 x 1h= 2h (external seminars)
Total teaching contact hours:	40	
Self-study time	85	
Total Learning hours	125	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	2h	30-50%
Case study take home	35h	10-30%
Oral presentation	2h	0-20%
Classwork	10h	0-20%
Fieldwork	10h	0-20%
Assessment Criteria: 1. Examination: Demonstrates comprehensive understanding of biodiversity assessment concepts. Accurately explains methods and principles related to ecological indicators and molecular tools. 2. Case Study Take-Home Assignment: Analyses and applies theoretical knowledge to practical scenarios. Provides well-supported arguments and submits work on time. 3. Oral Presentation:		

Presents information clearly and confidently.

Uses visual aids effectively and answers questions thoughtfully.

4. Classwork:

Actively participates and completes assignments accurately.

Collaborates effectively with peers.

5. Fieldwork:

Designs and implements precise field experiments.

Accurately records and analyses data, demonstrating proficiency in field techniques.

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Costello, Mark & Basher, Zeenatul & McLeod, Laura & Asaad, Irawan & Claus, Simon & Vandepitte, Leen & Yasuhara, Moriaki & Gislason, Henrik & Edwards, Martin & Appeltans, Ward & Enevoldsen, Henrik & Miloslavich, Patricia & Monte, Silvia & Sousa Pinto, Isabel & Obura, David & Bates, Amanda & Costello, M & Basher, Á & McLeod, Á & Gislason, H. (2017). Methods for the Study of Marine Biodiversity. 10.1007/978-3-319-27288-7_6. (https://doi.org/10.1007/978-3-319-27288-7_6)

Lotze-Campen, Hermann & Reusswig, Fritz & Stoll-Kleemann, Susanne. (2008). Socio-Ecological Monitoring of Biodiversity Change: Building upon the World Network of Biosphere Reserves. GAIA - Ecological Perspectives for Science and Society. 17. 107-115. 10.14512/gaia.17.S1.8. (<https://doi.org/10.14512/gaia.17.S1.8>)

Taormina, B., Claquin, P., Vivier, B., Navon, M., Pezy, J. P., Raoux, A., & Dauvin, J. C. (2022). A review of methods and indicators used to evaluate the ecological modifications generated by artificial structures on marine ecosystems. Journal of Environmental Management, 310, 114646. (<https://doi.org/10.3389/fmars.2016.00248>)

Bourlat, Sarah. (2016). Marine Genomics: Methods and Protocols. 10.1007/978-1-4939-3774-5.

SBE354-P5. Marine Ecosystem Accounting

Course name: Marine Ecosystem Accounting			
Course Code: SBE354-P5			
Fields/areas of study/areas of knowledge: Ocean Accounts, System of National Accounts, System of Environmental-Economic Accounting, Framework for Development of Environment Statistics			
University coordinating the course: UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 80% Online 20%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Successful completion of the courses Environmental Accounting (SBE210) and Marine Natural Capital and Ecosystem Services (SBE107)		
Short course description:			
Marine ecosystem accounting aims to analyse the interrelationship between economy, society and environment, how social and economic factors affect the value of ecosystem goods and services, and vice versa. The course would develop the statistical framework proposed by the Global Ocean Accounts Partnership (GOAP) for measuring the ocean, its importance to people, and the effects of their actions. It would provide the basis for the application and interpretation of the Ocean Accounts approach, a collection of accounts (or modules) organised around a conceptual framework. The Ocean Accounting Framework may be implemented selectively depending on national priorities, data availability, and technical capacity, involving varying degrees of			

uncertainty. Special attention would be given to the emerging carbon market and blue carbon. Related 1st and 2nd year courses: Environmental Accounting (SB210), Marine Natural Capital and Ecosystem Services (SBE107)

Course Content:

The course analyses and studies the statistical framework proposed by the Global Ocean Accounting Partnership (GOAP) to measure the ocean, its importance for people and the effects of their actions.

1. Introduction to Ocean Accounts.
 - The concept of "Ocean Accounts".
 - Overview of the Ocean Accounts Framework.
 - Scientific and statistical foundation of Ocean Accounts.
2. Structure of Ocean Accounts.
 - The spatial data infrastructure for Ocean Accounts
 - Scope boundaries of Ocean Accounts
 - Environmental asset accounts
 - Flows to the economy (supply and use accounts)
 - Flows to the environment accounts (residuals)
 - Ocean economy satellite accounts
 - Ocean governance accounts
 - Combined presentation
 - Ocean wealth accounts
3. Guidelines for the implementation, use and maintenance of Ocean Accounts.
 - Key actions for account development planning.
 - Key data sources.
 - Indicators for sustainable development.

Keywords: Ocean accounts, Ocean assets (natural capital), marine and coastal environment, national wealth, natural resources, environmental sustainability.

Programme Learning Outcomes (PLOs).

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. **Knowledge:** *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand human dependence on marine ecosystems.
- Recognize the value of marine ecosystem goods and services.
- Acknowledge the influence of human activities on marine ecosystem goods and services.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Identify marine ecosystem assets on which human activities depend.
- Assess the value of marine ecosystem assets and services.
- Use accounting tools (software and database).
- Apply acquired computer skills to work with ocean accounting.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Adopt critical thinking on the topic of marine resources use.
- Apply skills in assessing marine ecosystems goods and services.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lectures	11	2h (total 22h)
Practical Study-unit	5	2h (total 10h)
Project	2	2h (total 4h)
Seminar	2	2h (total 4H)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Oral and/or written examination		20% -45%
Project		50% - 80%
Classwork		0% - 10%
Attendance and participation in classes and seminars		0% - 10%
Assessment Criteria: <ul style="list-style-type: none"> • Completion of an oral/written exam on the theoretical and practical contents (A). • Development of a project related to oceans accounts (B). • Presentation of project reports by students (C). • Classwork (D). • Attendance and participation in classes, seminars, and lab sessions (E). <p>The final grade for the course will be determined as follows:</p> $\text{Final grade} = A \times w_a + B \times w_b + C \times w_c + D \times w_d + E \times w_e$ <p>Where:</p> <ul style="list-style-type: none"> • w_a = weighting chosen for assessment criterion A. • w_b = weighting chosen for assessment criterion B. • w_c = weighting chosen for assessment criterion C. • w_d = weighting chosen for assessment criterion D. • w_e = weighting chosen for assessment criterion E. 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> <ul style="list-style-type: none"> • Selected scientific articles and reports. • The Global Ocean Accounts Partnership. <i>Technical Guidance on Ocean Accounting for Sustainable Development</i> (United Nations, 2021). Retrieved from https://tinyurl.com/ygnkpvnz 		

SBE355-P5. Marine Ecosystem Conservation

Course name: Marine Ecosystems Conservation			
Course Code: SBE355-P5			
Field(s)/area(s) of study: marine conservation, marine			
University coordinating the course: UCA			
Participating universities: NORD, UALG			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course will examine the ecological foundations of marine conservation: understanding the elements of marine biodiversity, threats to different marine and coastal ecosystems, structure and function of the marine environment and methods for management and conservation. Students will explore methods for surveying and monitoring marine ecosystems and learn about the ecological consequences of human impacts. They will critically evaluate integrated conservation strategies, including decision-making on size, boundaries and connectivity of marine protected areas. The course will also examine legal procedures that are applied to the conservation of the marine and coastal environments.			
Course Content: <ul style="list-style-type: none">- Introduction: why marine conservation is necessary. Ecological concepts for marine conservation: biodiversity and ecosystem services.			

- Main threats of species and ecosystems. Fundamentals of management.
- Legal framework of marine ecosystem conservation. European Directives. Conventions and programs.
- Coastal hydrodynamics in shoreline erosion and accretion. Mapping the marine and coastal environment.
- Tools and approaches for ecological conservation: ecological framework and strategies.
- Managing biological populations in marine habitats (marine macrophytes, fisheries, turtles, seabirds, mammals, etc.).
- Conservation genetics and genomics. Genetic diversity, methods for genetic and genomic management and conservation, population genetics and genomics. Genetic connectivity and seascape.
- Marine wildlife conservation initiatives: natural-positive seascape, rewilding, market and blue finance.
- Marine Protected Areas: selection, size, boundaries, connectivity. Management of Marine Protected Areas, indicators of good environmental practices.
- Case studies in marine ecosystems conservation.

Keywords: marine ecosystems science, biodiversity, marine protected areas, monitoring.

Programme Learning Outcomes (PLOs)

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- Understand theories, concepts and principles relevant to the field of the science of marine conservation,
- Be able to place the scientific knowledge in marine conservation science and international frameworks,
- Understand management procedures relevant to marine conservation plans and actions.

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Critically evaluate and apply scientific knowledge and skills in the development and implementation of practical solutions to marine conservation strategies,
- Plan, execute and report on a project involving original research in laboratory and field settings,
- Analyse published work in the field of marine ecosystems conservation.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Develop sensitivity towards environmental problems that affect the threatened marine ecosystems,
- Apply their skills in professional activities related to impact recognition and management on marine conservation tasks/activities,
- Propose, develop, present and defend scientific and/or technical work in the field of the discipline.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, fieldtrips, etc.)

Method	Number of sessions	Duration
Lectures	10	10 x 2 h (total 20h)
Fieldwork	2	2 x 5 h (total 10h)
Lab session	1	4 h
Seminars	3	3 x 2h (total 6h)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	2h	30-50%
Oral presentation	2h	0-10%
Case study take home	35h	10-30%
Classwork	10h	0-20%
Fieldwork	10h	10-20%
Assessment Criteria: Attendance and participation in class and the field sessions. Report and oral Presentation Written examination of the course content		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> Basic literature Allendorf FW, Luikart G (2007). <i>Conservation and the genetics of populations</i> . Blackwell, Oxford. Amato G. (2009). <i>Conservation genetics in the age of genomics</i> . Columbia University Press, New York. Bertness M, Bruno J, Silliman B, Stachowicz J (2013). <i>Marine community Ecology and conservation</i> . Oxford University Press. Bertorelle, G (2009). <i>Population genetics for animal conservation</i> . Cambridge University, Cambridge. Hamilton, MB (2009). <i>Population genetics</i> . Ed. Wiley-Blackwell, Oxford. Hiscock K (2014). <i>Marine Biodiversity Conservation: A Practical Approach</i> . Taylor & Francis. Probert PK (2017). <i>Marine Conservation</i> . Cambridge University Press Ray GC, McCormich (2014). <i>Marine conservation: Science, Policy, and management</i> . Wiley Blackwell. Roff JC, Zachariuas M (2011). <i>Marine conservation Ecology</i> . Earthscan. Relevant websites		

www.eea.europa.eu/publications/marine-protected-areas/marine-protected-areas (Marine Protected Areas).

www.ospar.org (OSPAR convention).

www.unep.org/unepmap/ (Mediterranean Action Plan).

www.coalitionforconservationgenetics.org (Conservation Genetics).

<https://www.iucn.org/> (International Union for Conservation of Nature)

SBE356-P5. Marine Ecosystem Restoration

Course name: Marine Ecosystems Restoration			
Course Code: SBE336-P3/SBE356-P5			
Field(s)/area(s) of study: marine ecology, marine science, marine conservation			
University coordinating the course: UCA and NORD			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 20% Online 80%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Students should have a general knowledge about marine ecosystems		
Short course description:			
The course aims to provide the principles and strategies for the recovery of degraded marine ecosystems, including coastal ecosystems. Ecological succession. Resilience. Theory of steady states. Marine restoration planning. Reference scenario, restoration and rehabilitation. Identification of drivers and stabilizing mechanisms. Selection of target species. Blue carbon accounting and standards of blue carbon. Cost analysis. Nature-based solutions. Restoration field protocols. Marine ecosystem restoration projects. Related 1st and 2nd year courses: Marine Ecosystems and Biodiversity (SB101), Ocean functioning (SBE102)			
Course Content:			
11. Introduction to ecological restoration: insights from historical development to future needs.			

12. Outline the types of ecosystems and ecosystem services.
13. Key ecological concepts to restoration plans: from ecological succession, to assess degraded ecosystems or establishment of priorities areas.
14. Introduction to the Short-Term Action Plan on Ecosystem Restoration (STAPER).
15. Assessing institutional, policy and legal frameworks.
16. Strategic planning process I: perspectives about understanding and overcoming limitations in restoration projects.
17. Strategic planning process II: assessment of the ecological benefits of restoration activities.
18. Cost-benefit analysis, accounting processes and resource mobilisation.
19. Monitoring and evaluating the impacts of restoration projects: A case of study.
20. Strategic and risk planning in restoration projects: how to develop implementation tasks, schedules and budgets. Case of study.

Keywords: marine restoration, marine conservation, coastal habitats, ecosystem services

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Define ecosystem restoration and explain its importance;
- Outline the types of ecosystems and ecosystem services;
- Understand the steps and activities involved in developing a plan for ecosystem restoration;

- Conceptualise the application of the Short-Term Action Plan on Ecosystem Restoration in your context

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Critically evaluate and apply scientific knowledge and skills in the development and implementation of practical solutions to marine restoration strategies;
- Plan, execute and report on a project involving original research in laboratory and field settings;
- Involve stakeholder participation with inclusive communication, skills and gender-responsive planning, being critical to the restoration project.

3. **Autonomy & Responsibility:** *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Plan and implement a restoration programme in several marine and coastal habitats;
- Select the main criteria for establishing the success of restoration projects.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
Lecturers	10	20h
Fieldwork	1	4h
Project	4	10h
Seminars	2	6h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	2h	30-50%
Classwork	10h	0-20%
Case study take home	35h	10-30%
Oral presentation	2h	0-10%
Fieldwork	4h	0-10%
Assessment Criteria: <ul style="list-style-type: none"> • Written examination of the theoretical contents. • Attendance and participation in class and the field sessions. • Report and oral presentation 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature)</i> <p>.- Abelson, A., Halpern, B., Reed, D., Orth, R., Kendrick, G., Beck, M., Belmaker, J., Krause, G., Edgar, G., Aioldi, L., Brokovich, E., France, R., Shashar, N., Blaeij, A., Stambler, N., Salameh, P., Shechter, M., & Nelson, P. (2015). Upgrading Marine Ecosystem Restoration Using Ecological-Social Concepts. <i>Bioscience</i>, 66, 156 - 163. https://doi.org/10.1093/biosci/biv171.</p> <p>.- Bayraktarov, E., Brisbane, S., Hagger, V., Smith, C., Wilson, K., Lovelock, C., Gillies, C., Steven, A., & Saunders, M. (2020). Priorities and Motivations of Marine Coastal Restoration Research. , 7. https://doi.org/10.3389/fmars.2020.00484.</p> <p>.- Filbee-Dexter, K., Wernberg, T., Barreiro, R., Coleman, M., Bettignies, T., Feehan, C., Franco, J., Hasler, B., Louro, I., Norderhaug, K., Staehr, P., Tuya, F., & Verbeek, J. (2022). Leveraging the blue economy to transform marine forest restoration. <i>Journal of Phycology</i>, 58. https://doi.org/10.1111/jpy.13239.</p> <p>.- Sheaves, M., Waltham, N., Benham, C., Bradley, M., Mattone, C., Diedrich, A., Sheaves, J., Sheaves, A., Hernandez, S., Dale, P., Banhalimi-Zakar, Z., & Newlands, M. (2021). Restoration of marine ecosystems: Understanding possible futures for optimal outcomes.. <i>The Science of the total environment</i>, 796, 148845 . https://doi.org/10.1016/j.scitotenv.2021.148845.</p>		

SBE357-P5. Social Dimension in the Blue Management

Course name: Social Dimension in the Blue Management			
Course Code: SBE357-P5			
Field(s)/area(s) of study/areas of knowledge: Department of History, Geography and Philosophy (Area of Archaeology, Area Geographical analysis), Department of Business Organisations (Area of Human Resource Management)			
University coordinating the course: UCA			
Participating universities:			
Total ECTS:	5	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes (partially)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course provides an examination of the role that society plays in the preservation and sustainable management of marine environments. The objective is to understand the importance of including society in marine management processes in decision-making. To this end, it is necessary to know the procedures for citizen participation that can be developed. Moreover, the course gives key ideas on the importance of the conservation of coastal-marine cultural heritage, and the implications that society has in its achievement. Topics covered include social awareness, the preservation of cultural heritage, and the significance of human wellbeing within the context of marine			

ecosystem services. Furthermore, participants will gain insight into the emerging field of Citizen Science and its profound implications for data collection methodologies in blue management.

Course Content:

1. Introduction to the sociology of the marine environment.
2. Marine management process and the importance of society in the process.
3. Public participation in marine management
4. Human wellbeing from marine ecosystem services
5. Cultural heritage in the management of the coastal-marine environment
6. Business strategies and sustainable development.
7. Optimization of operations to minimise environmental impact.
8. Development of competencies (i.e. Communication and awareness of sustainability, decision-making, change management, sustainable leadership, etc.) on activities associated with the blue economy
9. Commitment of stakeholders in the blue economy: Culture heritage
10. Personnel strategies based on employee commitment to the blue economy.
11. Talent development and training in sustainability and responsible practices.
12. Implementation of well-being policies and occupational health and safety practices for employees in coastal sectors.
13. Promoting diversity, transparency, objectivity and justice as main principles in the blue industry workforce.
14. Strategies to motivate and engage employees in sustainability initiatives.
15. Citizen science

Keywords: social perception, management process, human wellbeing, public participation, sustainable development, environmental impact

Programme Learning Outcomes (PLOs)

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *Identify the different phases of a coastal-marine management process and how society is included in each of them.*
- *To understand the relationships between ecosystem services and human well-being in the coastal-marine environment.*
- *Relate the conservation of cultural heritage with human well-being.*
- *Initiate in citizen science techniques, data collection and analysis.*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *Speak and communicate in scientific and socially accessible language about ecosystem services and human well-being.*
- *Leadership and autonomy to understand management processes.*
- *Ability to identify in the field the main ecosystem services and how they affect social well-being.*

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- *Working independently in coastal-marine management processes.*

<ul style="list-style-type: none">• Work in a multidisciplinary group for the development of a management process.• Incorporate stakeholders in decision-making in marine management processes.		
Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)		
Method	Number of sessions	Duration
Lectures	10	2h each = 20 h
Fieldwork (fieldtrip)	1	4h = 4 h
Seminar	4	2h each = 8h
Project	4	2h each = 8h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Participation	20h	15%
Examination	2h30m	50%
Fieldwork	4h and report	15%
Project	10pp	20%
Assessment Criteria: <ul style="list-style-type: none">• <i>Completion of an exam with the theoretical contents.</i>• <i>Attendance and participation in class.</i>• <i>Development of a project of marine management, including public participation</i>• <i>Development of practical field work and a report about the field trip.</i>		
Study materials/Course literature: <p><i>Barragan, J. M. (2014). Política, gestión y litoral. Una nueva visión de la gestión integrada de áreas litorales. Tebar, UNESCO.</i></p> <p><i>Barragan, J. M. (2003). Medio ambiente y desarrollo de Areas litorales: Introducción a la planificación y gestión integradas. Universidad de Cádiz.</i></p> <p><i>Kay, R., & Alder, J. (1999). Coastal planning and management. E&FN Spon.</i></p>		

Clark, J. R. (1996). *Coastal Zone Management Handbook*. CRC Press.

Agardy, T., Alder, J., Dayton, P., Curran, S., Kitchingman, A., Wilson, M., Catenazzi, A., Restrepo, J., Birkeland, C., Blaber, S., Saifullah, S., Branch, G., Boersma, D., Nixon, S., Dugan, P., Davidson, N., Vörösmarty, C., 2005. Chapter 19. Coastal Systems, in: *The Millenium Ecosystems Assessment Series (MEA). Ecosystems and Human Well-Being: Current Status and Trends. Volulme 1*. pp. 513–550.

Molina, R., di Paola, G., Manno, G., Panicciari, A., Anfuso, G., & Cooper, A. (2023). A DAPSI(W)R(M) framework approach to characterization of environmental issues in touristic coastal systems. An example from Southern Spain. *Ocean and Coastal Management*, 244. <https://doi.org/10.1016/j.ocecoaman.2023.106797>

UNESCO-IOC/European Commission. (2021). *MSPglobal International Guide on Marine/Maritime Spatial Planning* (p. 152). UNESCO (IOC Manual and guides no 89).

Molina, R., di Paola, G., Manno, G., Panicciari, A., Anfuso, G., & Cooper, A. (2023). A DAPSI(W)R(M) framework approach to characterization of environmental issues in touristic coastal systems. An example from Southern Spain. *Ocean and Coastal Management*, 244. <https://doi.org/10.1016/j.ocecoaman.2023.106797>

UNEP. (2011). *Taking Steps toward Marine and Coastal Ecosystem-Based Management- An Introductory Guide*. <https://doi.org/ISBN: 978-92-807-3173-6>

Kosmus, M., Renner, I., Ullrich, S., 2012. Integración de los servicios ecosistémicos en la planificación del desarrollo. Un enfoque sistemático en pasos para profesionales basado en TEEB. *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Bonn; Eschborn (Alemania) y Quito (Ecuador)*. (Kosmus et al., 2012)

Ounanian, K., van Tatenhove, J. P. M., Hansen, C. J., Delaney, A. E., Bohnstedt, H., Azzopardi, E., Flannery, W., Toonen, H., Kenter, J. O., Ferguson, L., Kraan, M., Macias, J. V., Lamers, M., Pita, C., Ferreira da Silva, A. M., Albuquerque, H., Alves, F. L., Mylona, D., & Frangoudes, K. (2021). Conceptualizing coastal and maritime cultural heritage through communities of meaning and participation. *Ocean & Coastal Management*, 212, 105806. <https://doi.org/10.1016/J.OCECOAMAN.2021.105806>

Delaney, A.E., Martino, S., Kenter, J.O., Azzopardi, E., 2021. Chapter 2: Setting the scene – Challenges and concepts for sustainable, integrated heritage governance. In: Kenter, J.O. and Martino, S. (eds), 2021. *Sustainable governance of marine and coastal heritage – Methods, tools, and approaches*. PERICLES / European Commission, Brussels.

SBE358-P5. Project Management

Course name: Project Management			
Course Code: SBE358-P5			
Field(s)/area(s) of study: Management and Administration			
University coordinating the course: UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Project Management is a subject of practical application, ranging from strategic implementation and management of projects focused on competitiveness, change management, and innovation. The discipline provides a comprehensive approach to project management principles in the context of Blue Management. It equips students with skills to manage projects focused on sustainable development in Blue Management, particularly in accounting, conservation, and restoration. The curriculum includes an overview of Project Management methodologies, an introduction to the use of software tools, and a discussion of real-world case studies for inspiration. The contents may help students to obtain internationally recognized Project Management Professional certification, such as those offered by the Project Management Institute (PMI), the International Project Management Association (IPMA), or the European Commission (EC).			

Course Content:

1. FUNDAMENTALS OF PROJECT MANAGEMENT

Introduction to Project Management.

Project Contexts.

Strategic Importance of Projects.

Innovation and Continuous Improvement.

1. PROJECT MANAGEMENT: PREDICTIVE APPROACH

Project management principles and life cycle. Integration management.

Key project components: scope, schedule, cost and project control, resources, communication, risk, procurement, quality, stakeholders.

Overview of Waterfall methodologies.

Tools and techniques for project control (Gantt charts, Earned Value Management).

2. PROJECT MANAGEMENT: ADAPTIVE OR AGILE APPROACH

Goals and objectives; Project Plan and the Work Breakdown Structure (WBS).

Agile Manifesto: Principles; Roles; Scrum Master, Team; Development, Product Owner; Agile Events; Adaptation.

Overview of Agile methodology (including Scrum and Kanban).

Comparison of Agile and Waterfall methodologies.

Adaptive project management techniques.

3. COMMUNICATION AND RISK MANAGEMENT

Project stakeholders and communication strategies.

Project risk responses. Contingency plan.

Monitoring and controlling risks in Waterfall projects.

Sprints, inspection, and adaptation in Agile projects.

4. SUSTAINABILITY AND PROJECT MANAGEMENT

Integrating sustainability into project management.

Environmental impact assessment and mitigation strategies.

Social and economic aspects in Project Management.

5. CASE STUDIES AND BEST PRACTICES

Analysis of real-world sustainable projects in the Blue Industries: lessons learned from successful projects.

Good practices for managing projects in marine and coastal contexts.

6. PROJECT MANAGEMENT SOFTWARE

Project management freeware for task organisation, project tracking, and collaboration, suitable for managing smaller projects, easy visualisation of tasks. Examples of free Project Management software tools: Trello (Preferred), Asana, ClickUp, Wrike, ActiveCollab, Airtable, Jira, Height.

Keywords: *project management, stakeholders, strategy, risk*

Programme Learning Outcomes (PLOs):

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the Blue Industries.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Gain a comprehensive understanding of project management principles in the context of sustainable practices in the Blue Industries.
- Understand core project management concepts, including scope, time, cost, quality, and risk.
- Extract lessons from actual projects to improve project management practices.

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Describe several project management methodologies, such as Agile or Waterfall, recognizing their applicability in different types of projects.
- Develop a project management plan.

- Identify project stakeholders and prepare effective communication approaches.
- Incorporate sustainability principles into project management, focusing on environmental impact assessment and social responsibility.
- Identify project risks and formulate mitigation strategies.
- Implement quality control to certify that deliverables meet required standards.

3. **Autonomy & Responsibility**: Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Implement project plans and manage tasks and teams to achieve project goals.
- Monitor and evaluate project progress.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	10	20h
Project	6	12h
Tutorials	4	
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Up to 4,000 words	20%
Research Project	Up to 9,000 words	40%
Case Study (Take Home)	Up to 3,000 words	30%
Classwork	12h	10%

Assessment Criteria:

1. Assignment (20%): Students will work in groups to create a project proposal that outlines a new initiative within the Blue Industries. This proposal should

include project goals, scope, key stakeholders, estimated timeline, and expected outcomes.

2. Research Project (40%): A comprehensive project management plan for the group's proposed project. This plan should include a work breakdown structure (WBS), a Gantt chart for project scheduling, a risk management plan, and a communication plan.

3. Case Study (Take Home) (30%): an individual case study related to an actual sustainable blue industry project, reflecting on the challenges and solutions presented in the case.

4. Classwork (10%): Attendance and active participation in class discussions and practical sessions.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

International Project Management Association (IPMA). (2015). Individual Competence Baseline for Project Management (ICB) (4th ed.). IPMA.

International Project Management Association. (2018). IPMA Reference Guide ICB4 in an Agile World (2nd ed.). International Project Management Association.

Project Management Institute (PMI). (2021). A guide to the Project Management Body of Knowledge (PMBOK guide) (7th ed.). PMI.

TeamWork.com (2024, May 11). The Teamwork.com guide to project management, <https://www.teamwork.com/project-management-guide/project-management-methodologies>

Watt, A. (2014). Project management. BCcampus. <https://opentextbc.ca/projectmanagement/>

Wrike (2024, May 11). Project Management Guide for 2024, <https://www.wrike.com/project-management-guide/>

SBE359-P5. Innovation & Strategic Development in Blue Management

Course name: Innovation and Strategic Development in Blue Management			
Course Code: SBE359-P5			
Field(s)/area(s) of study: Blue Management: Accounting, Conservation and Restoration			
University coordinating the course: UCA			
Participating universities: University of Gdansk			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course is designed to advance aspects of innovation, providing a roadmap for its development in blue projects management. The contents explore the relevance of innovation in organisations and socioeconomic contexts to build value. The course provides the foundations of the innovation and shows how disruptive models can become valuable corporate and ecological assets. Based on case studies, students will put into practice different tools to learn how to design, implement and evaluate innovative disruptive strategies. Related 2nd year course: Sustainable Blue Entrepreneurship and Innovation (SBE203).			
Course Content: Fundamentals of innovation: Sources, Types and Patterns.			

Strategic Development of Innovation: Formulation and Implementation of Strategies, Innovation Management, the Dynamic Scope.

Innovative Disruptive Strategies.

Design, Implementation, and Evaluation of Innovative Disruptive Strategies.

Innovation Applied to Blue Industries.

Keywords: Innovation, Innovative disruptive models, Strategic development, Sustainability, Blue Management

Programme Learning Outcomes (PLOs):

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long-term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understand core innovation processes and their principal concepts and drivers.
- Gain a comprehensive understanding of disruptive innovation in the Blue Industries.
- Extract lessons from actual innovation projects to improve innovation practices

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Design an innovation plan in the Blue Industry incorporating disruptive models.

- Incorporate Sustainable Development Goals in the implementation of innovation plans.

3. **Autonomy & Responsibility**: Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Implement innovative disruptive strategies in the Blue Industry.
- Evaluate and monitor innovative disruptive strategies in the Blue Industry.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration (hours)
Lecture	10	20
Project (disruptive innovation)	6	12
Case Study	2	4
Tutorials	2	4
Total teaching contact hours	40	
Self-study time hours	85	
Total Learning hours	125	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Up to 4,000 words	20%
Research Project	Up to 9,000 words	40%
Case Study (Take Home)	Up to 3,000 words	30%
Classwork	12 hours	10%

Assessment Criteria:

1. Assignment (20%): Students will work in groups to create a basket of innovation projects proposals that outlines disruptive models of innovation within the Blue Industries. This proposal should include innovation goals, scope, key stakeholders, estimated timeline, opportunities that exist, targets for each innovation goal, expected outcomes, etc.

2. Research Project (40%): A comprehensive Strategic Development Innovation plan for the group's proposed project. This plan should include market research, evaluation of identified opportunities, selection of the innovation model, identification of support resources, etc.

3. Case Study (Take Home) (30%): an individual case study related to an actual innovation model in Blue Industries, reflecting on the challenges and solutions presented in the case.

4. Classwork (10%): Attendance and active participation in class discussions and practical sessions.

Study materials/Course literature: (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...*)

Anderson, N. R., & Gasteiger, R. M. (2008). Innovation and creativity in organisations: individual and work team research findings and implications for government policy. In B. Nooteboom & E. Stam (Eds.), *Micro-foundations for Innovation Policy* (pp. 249–272). Amsterdam University Press.
<http://www.jstor.org/stable/j.ctt46mwvr.14>

Carpenter, K. (2023). Innovation. <https://kpu.pressbooks.pub/innovation/>

Ferguson, B. (2019). Adjusting to change: The role of innovation. In *Competing for Influence: The Role of the Public Service in Better Government in Australia* (pp. 353–376). ANU Press. <http://www.jstor.org/stable/j.ctvp2n3pr.14>

Goodman, M. P., & Gerstel, D. (2020). Investing in Innovation. In W. Reinsch & S. Miller (Eds.), *Sharpening America's Innovative Edge* (pp. 5–15). Center for Strategic and International Studies (CSIS).
<http://www.jstor.org/stable/resrep26537.5>

Moliterni, F. (2017). Sustainability-oriented Business Model Innovation: Context and Drivers. Fondazione Eni Enrico Mattei (FEEM).
<http://www.jstor.org/stable/resrep16412>

Nooteboom, B., & Stam, E. (2008). INNOVATION, THE ECONOMY, AND POLICY. In B. Nooteboom & E. Stam (Eds.), *Micro-foundations for Innovation Policy* (pp. 17–52). Amsterdam University Press.
<http://www.jstor.org/stable/j.ctt46mwvr.6>

Nooteboom, B., & Went, R. (2008). INNOVATION AND ORGANISATION. In B. Nooteboom & E. Stam (Eds.), *Micro-foundations for Innovation Policy* (pp. 219–248). Amsterdam University Press.
<http://www.jstor.org/stable/j.ctt46mwvr.13>

Pace, L. A., Borch, K., & Deidun, A. (2023). Bridging knowledge gaps towards 2030: the use of foresight for the strategic management of a sustainable blue

economy. *Sustainability*, 15(13), 10026. <https://www.mdpi.com/2071-1050/15/13/10026>

Schilling, M. A. (2022). *Strategic Management of Technological Innovation*. McGraw-Hill Education. 7th ed.

Shields, K. (2023). *Leading innovation*. 2nd Ed. Fanshawe College Pressbooks. London, Ontario.
<https://ecampusontario.pressbooks.pub/leadinginnovation2/>

Swanson, L. A. (2017). *Entrepreneurship and Innovation Toolkit*. 3rd Ed. Fanshawe College Pressbooks. London, Ontario.
<https://pressbooks.bccampus.ca/entrepreneurship/>

Pathway 6. Blue Industries: Tourism and Seafood (UAlg/UCA)

SBE361-P6. Sustainable Blue Industries: Tourism & Seafood

Course name: Sustainable Blue Industries: Tourism and Seafood			
Course Code: SBE361-P6			
Field(s)/area(s) of study: Economics, Environmental Science, Sociology, Management, Policy Studies, Tourism Studies, Fisheries Science, Marine Affairs, Climate Change Studies, Geographical analysis			
University coordinating the course: UAlg/UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: This course comprehensively analyses the blue tourism and seafood industries within the broader context of the Blue Economy. With a focus on understanding their economic, social, and environmental dimensions, students will explore the current landscape of these industries internationally and with a particular emphasis on European countries. Throughout the course, special attention is given to emerging trends and innovative sectors that drive economic growth, sustainability, and employment creation within blue industries. Topics covered include novel seafood production methods, revitalising traditional activities as tourism attractions, and integrating sustainable practices into industry operations.			

A vital aspect of the course is the exploration of the costs and impacts associated with the depletion of blue natural capital and ecosystem services. Also, the EU regulatory context (CSRD, ESRS) will be addressed in the course to understand the challenges of biodiversity and ecosystems, water and marine resources.

Through case studies and analysis, students will examine strategies for ecosystem conservation, restoration, and business adaptation to mitigate these effects. Moreover, the course will highlight the tangible benefits of such efforts, emphasising the interconnectedness between conservation initiatives and the long-term viability of blue industries.

Students will gain a deep understanding of the challenges and opportunities within blue tourism and the seafood industry, including issues related to conservation, ecosystem management, cultural heritage preservation, and innovation. By integrating sector benchmarks, policy analysis, and real-world case studies, this course equips students with the knowledge and skills to navigate sustainable blue industries' complexities and contribute positively to their continued growth and development.

Course Content:

1. Introduction to Blue Tourism

Definition and components of blue tourism (Defining and understanding the diverse context of blue tourism)

The role of blue tourism in the sustainable blue economy (VUCA - Volatile, Uncertain, Complex and Ambiguous environment)

Economic, social, and environmental impacts.

Sustainable tourism initiatives and their implementation in marine environments.

2. Introduction to the Seafood Industry

Contribution to the blue economy.

Overview of global and European seafood markets.

Production and Sustainability

Methods of seafood production.

Challenges in sustainability and potential solutions.

3. Industry Analysis and Public Policy

European Blue Industries

Sector benchmarks (Eurostat, EU Blue Growth Annual Reports).

Evolution and current status in EU member states.

Policy and Management

Case studies on policy impacts and outcomes.

4. Ecosystem and Socio-Ecological Assessment

Conservation and Restoration

Costs and impacts of ecosystem depletion.

Benefits of conservation and restoration efforts.

Nature-Based Solutions

Integrated assessment of socio-ecological interactions.

Case studies of successful projects.

5. Challenges and New Trends

Social and Environmental Pressures

Analysis of vulnerabilities and environmental change impacts.

Trade-offs in managing blue industries.

Innovation and Management Strategies

Emerging sectors and trends.

6. Traditional Activities and Cultural Heritage

Cultural Significance

Role of traditional activities in tourism attraction.

Interaction between cultural heritage and blue tourism.

7. Sustainable Transition and Adaptation

Employment transitions in traditional sectors.

Employment transitions in traditional sectors.

Regulatory context (CSRD, ESRS, Taxonomy, CSDD) and understanding of biodiversity, ecosystems, water and marine resources.

Business adaptation and sustainability reporting

Keywords: Blue Tourism, Sustainable Tourism Initiatives, Seafood Industry, Ecosystem Assessment, Social and Environmental Pressures, Sustainable Transition

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO5. Identify the different economic actors and stakeholder groups in blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Identify the different dimensions of the blue tourism and seafood industries, with special attention to economic processes and elements.
- Understand the relationships between those activities and the ecosystem services in the coastal-marine environment.
- Relate the conservation of natural and cultural heritage with the sustainable development of blue industries and its contribution to local wellness.
- Initiate in new techniques, strategies and innovation procedures.
- Analyze Market Trends and Regulatory Frameworks
- Assess/Understand Economic Impacts
- Evaluate Environmental Impacts and Conservation Strategies
- Apply Sustainable Tourism Practices and Seafood Production Methods

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Speak and communicate in scientific and socially accessible language about economic indicators, ecosystem services and human well-being.
- Leadership and autonomy to understand management processes.
- Ability to identify in the field social, economic and environmental elements, processes and dimensions.

- Critical Thinking and Problem-Solving
- Practical Application of Sustainable Practices
- Creative Thinking and Innovation
- Effective Communication
- Collaborative Skills
- Research and Data Analysis

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Working independently in coastal-marine management processes.
- Work in a multidisciplinary group for the development of a management process.
- Independent Decision-Making
- Initiative and Proactivity
- Professional Integrity
- Accountability and Ownership
- Adaptability and Flexibility
- Continuous Learning and Development

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lecture	10	20h (2h each session)
Fieldwork (field trips)	2	8h (4h each session)
Seminar	3	6h (2h each session)
Project	3	6h (2h each session)
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Classwork	20h	15%
Examination	2h30	50%
Fieldwork	4h	15%

Project (the project developed as a teaching method will be used for assessment)	8000 words	20%
Assessment Criteria: <ul style="list-style-type: none"> • Completion of an exam with the theoretical contents. • Participation in class and classwork • Development of a project related with blue tourism and/or seafood, including strategies for sustainable development • Development of practical field work 		
Study materials/Course literature: <i>(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)</i> Lecture slides covering each topic discussed in class. Handouts summarising key points, definitions, and concepts. Literature: Garrod, B., & Gössling, S. (Eds.). (2007). New Frontiers in Marine Tourism (1st ed.). London: Routledge. https://doi.org/10.4324/9780080551081 . Gössling, S., & Hall, C. M. (2019). Tourism and water: Interactions, impacts and challenges (Vol. 24). Channel View Publications. Higham, J., Lück, M., & Mose, I. (Eds.). (2013). Marine wildlife and tourism management: Insights from the natural and social sciences. CABI. FAO. (2018). The State of World Fisheries and Aquaculture 2018-Meeting the sustainable development goals. Food and Agriculture Organization of the United Nations. FAO. (2022). Blue Transformation - Roadmap 2022–2030: A vision for FAO's work on aquatic food systems. Rome. https://doi.org/10.4060/cc0459en . United Nations Environment Programme (UNEP). (2009). Sustainable Coastal Tourism: an integrated planning and management approach. Priority Actions Programme Regional Activity Centre (PAP/RAC). Mediterranean Action Plan (MAP). ISBN: 978-92-807-2966-5. https://wedocs.unep.org/20.500.11822/7819 . Tonazzini, D., Fosse, J., Morales, E., González, A., Klarwein, S., Moukaddem, K., Louveau, O. (2019) Blue Tourism.Towards a sustainable coastal and maritime tourism in world marine regions. Edited by eco-union. Barcelona. Full report (152 pp): https://www.ecounion.eu/wp-content/uploads/2019/06/BLEU-TOURISM-		

STUDY.pdf; executive summary (36 pp): https://www.ecounion.eu/wp-content/uploads/2019/06/TRIPA_Angles_2_p.pdf.

Balestracci, G.; Sciacca, A.; Fosse, J.; Rochette, J. (2023). Towards Sustainable Blue Tourism: Trends, Challenges and Policy Pathways. Blue Tourism Initiative (Eco-union, IDDRI, CORDIO East Africa, IUCN and the Caribbean Natural Resources Institute). 61 pp. <https://www.ecounion.eu/en/towards-sustainable-blue-tourism-trends-challenges-and-policy-pathways/>.

Smith, H. D., Suárez de Vivero, J. L., & Agardy, T. S. (Eds.). (2016). Routledge Handbook of Ocean Resources and Management (1st ed.). Routledge.

European Commission, Directorate-General for Maritime Affairs and Fisheries, Joint Research Centre, Borriello, A., Calvo Santos, A., Ghiani, M. et al., The EU blue economy report 2023, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2771/7151>

Self-Study Sources: Academic journals such as Marine Policy, Journal of Sustainable Tourism, and Ocean & Coastal Management.

Relevant Websites: World Tourism Organization (UNWTO); European Commission - Maritime Affairs, and Fisheries; National Oceanic and Atmospheric Administration (NOAA); Blue Tourism Initiative; The Food and Agriculture Organization (FAO).

Documentaries:

"End of the Line" <https://www.youtube.com/watch?v=x42Ksy8gnBY>

"Plastic Ocean" <https://www.youtube.com/watch?v=yog7qmGZIIQ>

"Artifishal" <https://www.youtube.com/watch?v=XdNJ0JAwT7I>

"The price of fish" <https://www.youtube.com/watch?v=dIQNDYoymMU>

SBE362-P6. Social Dimension of Blue Industries

Course name: Social Dimension of Blue Industries			
Course Code: SBE362-P6			
Field(s)/area(s) of study: Sociology, Business Management			
University coordinating the course: University of Cadiz			
Participating universities: University of Cadiz and University of Algarve			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes (partially)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
This subject covers two areas: sociological and organisational.			
From the sociological point of view, the activity of the blue industry inevitably has an impact on the state of the marine environment and, consequently, on the well-being of coastal society. This course focuses, first, on the study of the social impacts of tourism and the activities associated with seafood. The different ethical, social and economic implications of tourism and seafood industries will be discussed. In addition, the implications of blue industry activity on economic dynamics and social movements will be addressed. Other social aspects included in the course will be: Blue labelling. Greenwashing. Population growth in coastal areas. Employment and livelihoods. Investment in society and environment. Coastal planning and management. Corrective and Compensatory measures. In this sense, this course embarks on the social tensions within two pivotal blue industries: tourism and seafood. By examining the intersection of society, tourism, and economy, participants will gain insight			

into the complex dynamics that shape coastal communities. Through case studies, discussions, and hands-on exercises, participants will develop a nuanced understanding of the social impacts of these industries, with a focus on mitigating tensions and promoting sustainable development.

However, any commitment to sustainability requires the involvement of all stakeholders in tourism management, from managers to anyone with any type of link (internal or external) to the organisation. From an organisational perspective, it is necessary to consider various aspects of sustainable management that impact the improvement of social well-being: organisational and managerial engagement in sustainable blue economy issues, incorporation into the organisation's values, culture, and interests; the role of manager in addressing the fundamental principles of the sustainable blue economy; actions that integrate these principles into the company's strategy, allocating adequate resources, and promoting their acceptance and commitment among stakeholders. By embedding these sustainable values into daily operations, organisations can cultivate a workforce committed to sustainability. This commitment will be conveyed to society, contributing to its improvement. It is the responsibility of organisations and their managers to advocate for social and sustainable well-being by engaging their human resources.

Course Content:

1. Sociological Perspectives on Blue Industries

- Introduction to sociological approaches to the blue industries
- Social construction of coastal identities
- Power dynamics in the tourism and seafood sectors

2. Social Tensions in Tourism

- Tourism gentrification and community displacement
- Cultural commodification and authenticity debates
- Labor struggles and exploitation in tourism hotspots

3. Social Tensions in the Seafood Industry

- Access and control in fisheries
- Conflicts over resource allocation
- Labor rights and social justice in seafood supply chains

4. Management Strategies to Address Social Tensions

- Community-based (tourism) initiatives
- Participatory (fisheries) management models

- Corporate Social Responsibility in the Blue Economy

5. Social Impact Assessment

- Tools and methodologies for social impact assessment
- Stakeholder engagement and conflict resolution techniques
- Incorporating social indicators into sustainability metrics

6. Organisational contributions to the Blue Economy

- Organisational and managerial involvement in sustainable blue economy issues, incorporating these values, culture and interests.
- The manager's role in managing aspects related to the fundamental principles of the sustainable blue economy.
- Actions to implement these principles in the company's strategy and daily operations, including the allocation of adequate resources.
- Promoting the acceptance and commitment of these principles and values among human resources and managerial leadership.
- HRM actions that will lead to a workforce committed to sustainability.

Keywords: Tourism, Seafood industry, Social tensions, Management, Social impacts assessment and social wellbeing

Programme Learning Outcomes (PLOs):

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

By the end of the course, the student will be able to:

1. Understand sociological perspectives on blue industries, including the social construction of coastal identities and power dynamics.
2. Identify and analyse social tensions inherent in tourism and in seafood industries.
3. Evaluate management strategies for addressing social tensions.

4. Apply tools and methods for social impact in blue industries, including stakeholder engagement techniques, conflict resolution methods, and the incorporation of social indicators into sustainability metrics.
5. Analyse and discuss case studies of successful conflict resolution and collaborative governance models.
6. Critically evaluate sustainable tourism practices.
7. Critically evaluate sustainable seafood sourcing practices.
8. Synthesise theoretical knowledge and practical insights to propose solutions for mitigating social tensions and contributing to the development of more equitable and sustainable coastal communities.

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, field trips, etc.*)

Method	Number of sessions	Duration
Lecture	14	28h
Seminar	3	6h
Project	3	6h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods:

- Research Essay (30%): Each student prepares a theoretical essay (up to 6,000 words) on a topic related to social impacts and tensions in the blue industries. They will summarise recent research findings (up to 5 scientific papers in the topic) and reflect on the recommendations of the analysed scientific literature from Social and Management Sciences
- Case Study (30%): Each student will analyse a real-world case related to social tensions in either the tourism or seafood industry. They will identify social tensions, assess their social impact, and propose possible solutions, using a template with key analytical dimensions provided by the teaching team. The case study should articulate with sociological and management theories presented.
- Group Project: Social Impact Assessment (40%): Groups (up to three students) develop a social impact assessment of a selected tourism or seafood project. Groups will address social tensions, engagement of stakeholders, and suggest mitigation strategies. This includes both the preparation and delivery of a slideshow document (such as a PowerPoint file) and its presentation (of around 15 minutes) in class. The work should articulate with sociological and management theories presented.

Possible topics:

- Exploring social tensions and sustainable practices

- Conflict resolution in coastal communities
- Collaborative governance models in tourism development
- Collective Action in Sustainable Seafood Initiatives
- Principles and practices of responsible tourism
- Community empowerment through tourism
- Balancing economic growth with social equity
- Traceability and transparency in seafood supply chains
- Supporting small-scale fisheries and coastal livelihoods
- Promoting ethical consumption and seafood certification

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Research Essay	Up to 6,000 words	30%
Case study	Up to 5,000 words	30%
Group Project (up to three students)	Oral presentation 15'	40%

Assessment Criteria:

1. Domain of the topics addressed:

- Demonstrates a comprehensive understanding of the topic, including key concepts, theories, and historical context.
- Shows familiarity with relevant literature, debates, and research findings related to the topic.
- Provides insightful analysis and interpretation of the subject matter, demonstrating depth of knowledge and critical engagement.
- Capacity of syntheses, integrating diverse sources of information, perspectives, and theories to develop coherent and well-supported arguments or conclusions.

2. Argumentative capacity:

- Presents a clear and coherent argument or thesis statement that guides the discussion.
- Develops arguments logically and persuasively, using evidence, examples, and reasoning to support claims.
- Anticipates counterarguments and addresses potential objections, strengthening the overall argumentative structure.

3. Structure of the texts presented:

- Organizes ideas and information in a logical and systematic manner, with clear transitions between sections or paragraphs.

- Uses headings, subheadings, and formatting conventions effectively to enhance readability and comprehension.
- Maintains a balanced and cohesive structure throughout the text, avoiding repetition or digression.

4. Writing quality:

- Demonstrates clarity, precision, and coherence in expression, with well-constructed sentences and paragraphs.
- Uses appropriate language, tone, and style for the intended audience and purpose of the text.
- Applies grammar, spelling, and punctuation conventions accurately, enhancing readability and professionalism.

5. Diversity of bibliographic sources used:

- Draws upon a variety of scholarly sources, including peer-reviewed articles, books, reports, and other relevant literature.
- Incorporates diverse perspectives and methodologies from different authors or schools of thought within the field.
- Critically evaluates the credibility, relevance, and currency of sources, demonstrating discernment in selection and integration.

6. Originality:

- Demonstrates creativity and innovation in approaching the topic, offering fresh perspectives or novel insights that contribute to the advancement of knowledge in the field.
- Integrates interdisciplinary perspectives or draws connections between seemingly unrelated areas, fostering cross-fertilization of ideas.
- Offers original interpretations or analyses of data, phenomena, or case studies, shedding new light on complex issues or phenomena.
- Generates thought-provoking questions or hypotheses that stimulate further inquiry and research within the discipline.

7. Collaborative Skills:

- Ability to work effectively in groups or teams, including communication, collaboration, and conflict resolution skills.

Study materials/Course literature:

Tourism: Principles and Practice, by John Fletcher, Alan Fyall, David Gilbert, and Stephen Wanhill. Pearson: UK. 2017.

The Social Construction of Reality: A Treatise in the Sociology of Knowledge, by Peter L. Berger and Thomas Luckmann. Open Road Media, 2011.

Tourism and global environmental change: ecological, social, economic, and political interrelationships, by Stefan Gössling and C. Michael Hall. Routledge, 2006.

Community-Based Fisheries Management: A Global Perspective by Devashish Kar. Academic Press, 2020.

Specific scientific papers may be distributed by the teaching team:

Cocola-Gant, A., Gago, A. and Jover, J. (2020). "Tourism, Gentrification and Neighbourhood Change: An Analytical Framework– Reflections from Southern European Cities", Oskam, J.A. (Ed.) *The Overtourism Debate*, Emerald Publishing Limited, Leeds, pp. 121-135. <https://doi.org/10.1108/978-1-83867-487-820201009>

Alexander, K.A., Kelling, I. (2024). Social sustainability in seafood systems: a rapid review. *Cambridge Prisms: Coastal Futures*. 2024;2: e1. doi:10.1017/cft.2023.31

Online information retrieved from the United Nations World Tourism Organization (UNWTO) for Reports on sustainable tourism practices and social impacts of tourism, of Food and Agriculture Organization (FAO) for Reports on fisheries management, small-scale fisheries, and social issues in the seafood industry, and from the World Bank - Reports on coastal development, sustainable tourism, and community-based fisheries management.

SBE363-P6. Policy & Regulatory Framework in Blue Industries

Course name: Policy And Regulatory Framework In Blue Industries			
Course Code: SBE363-P6			
Field(s)/area(s) of study/areas of knowledge: Policy, Law, Tourism Sector, Seafood Production.			
University coordinating the course: Universidade do Algarve			
Participating universities:			
Total ECTS:	5	Language of instruction:	English
Mode of Delivery:	Onsite 90% Online 10%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: Policy, legal and regulatory frameworks are key to the planning and implementation of both management and business. This course develops the European Regulatory framework, and refer to national models selected for their singularity. In the tourism sector, the integration of the sustainable development principle in the European Treaties established a framework for tourism governance and policy, while the 2007 Lisbon Treaty established the European policy explicitly related to tourism. The European regulatory framework for seafood production is primarily based on the Common Fisheries Policy (CFP) of the European Union, which offers guidelines for the sustainable management of marine and aquatic resources.			
Course Content: Regulatory Framework of Blue Management and Ocean Governance (1 ECTS)			

<p>Institutional Framework</p> <p>Marine-based activities</p> <p>Marine-related activities</p> <p>Regional Experiences</p> <p>European regulatory framework for seafood production (1 ECTS)</p> <p>Regulatory frameworks for tourism (3 ECTS)</p> <p>1.- Introduction to Law and contracts. 2.- Regulatory framework of tourism activity. 3.- Tourism companies and nautical tourism. 4.- Tourist as a consumer. 5.- Marina legal regime. 6.- Tourism and nautical contracts in general. 7. The mooring contract for recreational boats. 8.-The nautical charter contract for tourism. 9.- Contractual and non-contractual civil liability.</p>
<p>Keywords: Blue management and business, sustainable tourism, seafood industries</p>
<p>Programme Learning Outcomes (PLOs)</p> <p>PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.</p> <p>PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.</p> <p>PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.</p> <p>PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.</p> <p>PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>Level: The intended learning outcomes should align with the corresponding level in the Framework for Qualifications in the European Higher Education Area (FQ-EHEA), as well as the applicable national qualifications framework(s);</p> <p>Disciplinary field: The intended learning outcomes should comprise knowledge, skills, and competencies in the respective disciplinary field(s);</p> <p>Achievement: The programme should be able to demonstrate that the intended learning outcomes are achieved.</p> <p>1. Knowledge: <i>knowledge is described as theoretical and/or factual.</i></p>

By the end of the course the student will be able to:

- Have a general understanding of what is Blue management and its fundamental principles
- Understand the importance of the international legal and institutional frameworks for the sustainable tourism and fisheries/aquaculture
- Comprehend key legal and policy issues regarding tourism, fisheries and seafood production
- Understand the importance of animal welfare regulation in aquaculture production

2. **Skills** (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Identify contemporary policy and legal issues relating to fisheries, aquaculture and tourism
- Identify the strengths and weaknesses of the current legal framework concerned with fisheries, aquaculture and tourism

3. **Autonomy & Responsibility**: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student should be able to:

- Recognize current and future challenges in blue management
- Apply knowledge to different/novel circumstances
- Contribute to current discussions on behalf of governments, NGOs or other stakeholders

Teaching and Learning Methods. Course activities/Study Loads (*workshops, lectures, seminars, fieldtrips, etc.*)

Method	Number of sessions	Duration
Lectures	40	1h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods:		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	5000 words	20%

Case study (take home)	2000 words	10%
Examination	2 hours	50%
Oral presentation	1 hour (0.3 hour per student)	20%
Assessment Criteria: Assignment (20%); Case study (10%) Examination (50%); and Oral presentation (30%).		
<p>Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)</p> <p><i>T. Luković, Nautical tourism, CABI Digital Library, 2013.</i></p> <p><i>Joseph M. Cheer, Alan A. Lew (eds.), Tourism, Resilience and Sustainability Adapting to Social, Political and Economic Change, Routledge, 2021.</i></p> <p><i>Mark Orams, Marine Tourism: Development, Impacts and Management, Routledge, 1999.</i></p> <p><i>Jonatan Echebarria Fernández, Tafsir Matin Johansson, Jon A. Skinner, Mitchell Lennan (eds.) Fisheries and the Law in Europe. Regulation After Brexit, Routledge, 2022</i></p> <p><i>Mary Ann Palma et al., Promoting Sustainable Fisheries, Martinus Nijhoff Publishers, Leiden-Boston, 2010</i></p> <p><i>Nigel Banks et al, Aquaculture Law and Policy Global, Regional and National Perspectives, Edward Elgar Publishing, 2016</i></p> <p><i>Naylor, R., Fang, S., & Fanzo, J. (2023). A global view of aquaculture policy. Food Policy, 116, 102422.</i></p> <p><i>Pavlidis, M., Papaharisis, L., Adamek, M., Steinhagen, D., Jung-Schroers, V., Kristiansen, T., Theodoridi, A., Otero Lourido, F. (2023). Research for PECH Committee – Animal welfare of farmed fish, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.</i></p>		

SBE364-P6. Strategy Management

Course name: Strategy Management			
Course Code: SBE364-P6			
Field(s)/area(s) of study: Blue Industries: Tourism and Seafood			
University coordinating the course: University of Cadiz			
Participating universities: University of Cadiz & University of Algarve			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description: The course is designed to advance aspects of innovation and its strategic management, providing a roadmap for its development in blue management projects and blue industries such as seafood and tourism. Consequently, the content explores the relevance of innovation in organisations and socio-economic contexts as a means of value creation. The course will demonstrate how appropriate innovation management, by following disruptive models, can become an asset both at the corporate and ecological levels. Students will learn the fundamental concepts of the innovation engine, as well as the Blue Ocean strategy, and will be introduced to advanced and disruptive design thinking. This course is related to the Blue Business Management (SBE109) course, taught during the first semester of the first academic year, and the Sustainable Blue Entrepreneurship and Innovation (SBE203) course, taught during the third term of the second academic year.			

Course Content:

- Strategy management - Overview of public and private policies.
- Why an innovation strategy? Exploring the potential research results from Blue Ocean Projects.
- Strategic management on organisational knowledge.
- National systems of innovation and entrepreneurship.
- Overview of the Technological entrepreneurship and its implication on the Innovation processes.
- Market adoption and technology diffusion: exploring the time lag between innovation and useable products.
- Management of research results on Blue Ocean technologies.
- Advanced case studies and best practices on strategy for the management of research results.
- Innovation engine by Tina Seelig.
- Advanced Blue Ocean strategy.
- Advanced design thinking.

Keywords: Strategy Management, Blue Ocean, Knowledge, Disruptive Innovation, Entrepreneurship.

Programme Learning Outcomes (PLOs):

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: knowledge is described as theoretical and/or factual.

By the end of the course the student will be able to:

- 1) Identify simplified strategy processes to optimise their research projects.
- 2) Develop a sustained understanding of the available tools and mechanisms able to increase the success of research.
- 3) Understand the use of strategies for increasing the value of intellectual assets, derived from Blue Ocean research result.

2. Skills (know-how): Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).

By the end of the course the student will be able to:

- 1) Identify and use tools to analyse innovative or entrepreneurial strategy processes, allowing to appreciate the nature and dynamics of those processes.
- 2) Reflect and integrate in their competences the specific mechanisms of strategy management capable of generating greater economic performances, reinforcing competitiveness standards, improving the management structure, ensuring adequate degrees of sustainability, and contributing to greater job creation.
- 3) To have developed capacities to identify strategies for the commercialization of innovative business projects and initiatives.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- 1) To develop strategies for managing disruptive innovation models.
- 2) To think creatively in the search for unconventional solutions.
- 3) To apply sustainability and, in general, the applicable Sustainable Development Goals to the seafood and tourism industries, both in the planning and execution of innovation strategies for these sectors.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lecture	10	20h
Project	6	12h
Tutorials	4	8h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Up to 4,000 words	40%
Research Project	Up to 4,000 words	40%
Classwork	12h	20%

Assessment Criteria:

1. Assignment (40%): Students will work in groups to study current existing innovation models and will propose the creation of several disruptive innovation models. Once evaluated all of them, they will select only one for the design of a strategy based on this innovation (innovation strategy design phase).
2. Research Project (40%): The formed group of students will implement the innovation strategy based on the previously selected disruptive model into the tourism and fisheries industries (innovation strategy implementation phase).
3. Classwork (20%): Attendance and active participation in class discussions and practical sessions with, eventually, case studies to solve in groups of students or individually.

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Strategy:

- Braun, M., Latham, S., & Cannatelli, B. (2019). Strategy and business models: why winning companies need both. *Journal of Business Strategy*, 40(5), 39-45. DOI: <http://dx.doi.org/10.1108/JBS-01-2019-0005>
- National Marine Fisheries Service (2023). NOAA's National Seafood Strategy. U.S. Department of Commerce. <https://www.fisheries.noaa.gov/s3/2023-08/2023-07-NOAAFisheries-Natl-Seafood-Strategy-final.pdf>
- Pugh, J., & Bourgeois III, L. J. (2011) "Doing Strategy". *Journal of Strategy and Management*, 4(2), 172-179. <http://dx.doi.org/10.1108/17554251111128637>

Blue Ocean strategy:

- What is Blue Ocean Strategy. <https://www.blueoceanstrategy.com/what-is-blue-ocean-strategy/>
- Chan Kim, W. & Mauborgne, R. (2005). Value innovation: a leap into the blue ocean. *Journal of Business Strategy*, 26(4), 22-28. DOI: <http://dx.doi.org/10.1108/02756660510608521>
- Food and Agriculture Organization of the United Nations [FAO] (2020). *The state of World Fisheries and Aquaculture. Sustainability in action*. Retrieved from <https://openknowledge.fao.org/server/api/core/bitstreams/170b89c1-7946-4f4d-914a-fc56e54769de/content>
- Leavy, B. (2005). Value pioneering -how to discover your own "blue ocean": interview with W. Chan Kim and René Mauborgne. *Strategy & Leadership*, 33(6), 13-20.

- Leavy, B. (2018). Value innovation and how to successfully incubate "blue ocean" initiatives. *Strategy & Leadership*, 46(6), 10-20.

Design Thinking Process:

- Baricevic, M. & Luic, L. (2023). From Active Learning to Innovative Thinking: The Influence of Learning the Design Thinking Process among Students. *Education Sciences*, 13(455). DOI: <https://doi.org/10.3390/educsci13050455>
- Moritz, G. (2019). *A practical guide to design thinking*. Friedrich-Ebert-Stiftung India Office. New Delhi: India. Retrieved from: <https://library.fes.de/pdf-files/bueros/indien/15404-20190508.pdf>

Innovation:

- Brad, S., Murar, M. & Brad, E. (2016). Methodology for lean design of disruptive innovations. *Procedia CIRP*, 50, 153–159. DOI: <http://dx.doi.org/10.1016/j.procir.2016.04.204>
- Chan Kim, W., & Mauborgne, R. (2023). Three avenues of innovation for new market creation and growth. *Strategy & Leadership*, 51(5), 11-15. DOI: <http://dx.doi.org/10.1108/SL-07-2023-0071>
- Christensen, C. M., Raynor, M. & McDonald, R. (2015). What Is Disruptive Innovation? *Harvard Business Review*. https://www.hbs.edu/ris/Publication%20Files/McDonald_Rory_A04_What%20is%20Disruptive%20Innovation_182498a6-5391-4916-a38b-d14932db41a6.pdf
- Clayton Christensen Institute (2023). Disruptive Innovation. <https://www.christenseninstitute.org/disruptive-innovations/#:~:text=Theory-,Disruptive%20Innovation,upmarket%2C%20eventually%20displacing%20established%20competitors>
- Larson, C. (2016 November 15). Disruptive Innovation Theory: What it is & 4 Key Concepts. *Harvard Business School Online*. <https://online.hbs.edu/blog/post/4-keys-to-understanding-clayton-christensens-theory-of-disruptive-innovation>
- Nieto Cubero, J., Adebayo Gbadegeshin, S. & Consolación, C. (2021). Commercialization of disruptive innovations: Literature review and proposal for a process framework. *International Journal of Innovation Studies*, 5, 127-144. DOI: <https://doi.org/10.1016/j.ijis.2021.07.001>
- Rasool, F., Koomsap, P., Afsar, B. & Ali Panezai, B. (2018). A framework for disruptive innovation. *Foresight*, 20(3), 252-270. DOI: <http://dx.doi.org/10.1108/FS-10-2017-0057>
- Simon Weinreich, S., Şahin, T., Huth, T., Breimesser, H., Vietor, T. (2021). How to manage disruptive innovation - a conceptual methodology for value-oriented portfolio planning. *Procedia CIRP*, 100, 403-408. DOI: <https://doi.org/10.1016/j.procir.2021.05.095>

SBE365-P6. Life Cycle in Blue Industries

Course name: Life Cycle in Blue Industries			
Course Code: SBE365-P6			
Field(s)/area(s) of study: Environmental protection technology, environment, engineering and engineering trades.			
University coordinating the course: University of Algarve			
Participating universities: University of Algarve /University of Cádiz			
Total ECTS:	5	Language of instruction:	English
Mode of Delivery:	Onsite 70 Online 30	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	It is advisable that students have successfully completed the first and second year courses, with a particular focus on the subjects SBE205 Blue Circular Economy, SBE209 Introduction to Blue Industries, and SBE210 Environmental Accounting. Experience using Excel or similar spreadsheet software.		
Short course description: Life Cycle is a basic tool to support decision-making for the sustainable development of products and services. It is a comprehensive method for assessing direct and indirect environmental impacts across the full life cycle of a product system, comprising materials acquisition, manufacturing, transport, use and end-life disposition (disposal or reuse). The course will focus on the four common stages of Life Cycle Assessment (LCA): (i) definition of the Goal and Scope; (ii) Life Cycle Inventory Analysis; (iii) Life Cycle Impact Assessment and (iv) Interpretation. Case studies will consider LCA studies in blue industries. Learning will be facilitated through			

completion of an example project that will be completed throughout the course.

Course Content: The course would address the different standardised methodologies for its application with an Introduction to life cycle thinking. The structure of an ISO standard life cycle assessment: goal and scope definition, life cycle inventory analysis (LCI), life cycle impact assessment (LCIA) and life cycle interpretation and uncertainty. Training with LCA software. Interpretation of results. Environmental footprint (i.e. carbon footprint, water footprint). LCA in product design. Certification Systems. Case study example in blue industries.

Keywords: Sustainable Development; LCA concept; Life cycle thinking; Goal and Scope definition, Inventory; Impact Assessment; Interpretation.

Programme Learning Outcomes (PLOs)

PLO3, PLO4, PLO6, PLO8, PLO9, PLO10, PLO11

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

Advanced knowledge of LCA applied to the blue sectors, involving a critical understanding of standardised methodology, principles and their reports.

(1) Prepare a goal and scope statement for an LCA of a product or process within a blue industry;

(2) Organise and manipulate data sources to build an LCI in order to undertake an LCA of a product or process within a blue industry;

(3) Perform a simple LCIA (i.e.: for climate change impact) of a product or process within a blue industry;

(4) Interpretation of results; and

(5) Communicate LCA findings using ISO standard reporting and oral presentation

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Soft skills: *Self-criticism, communication, decision making, problem solving, teamwork, goal setting and critical thinking.*

Advanced skills:

· To understand and apply LCA as a decision-making tool based on the environmental impact of the activities carried out in Blue Industries

· To understand and perform LCA according to standardised procedures, as ISO.

· To understand and interpret the results and outcomes of LCA in a decision-making process.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

Manage complex technical or professional activities or projects based on LCA, taking responsibility for decision-making in unpredictable work or study contexts applied to blue industries; take responsibility for managing professional development of individuals and groups for development a formal LCA study.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

See pdf with definitions of teaching and learning methods (separate document).

Method	Number of sessions	Duration
Lectures	11	11 sessions x 2h/session= 22 h
Practical Study-Units	6	6 sessions x 2h/session= 12 h
Fieldwork <i>(research on database and blue industries process)</i>	2	2 sessions x 2h/session= 4h
Performance	1	1 session x 2 h/session = 2 h
Total teaching contact hours:	40 h	
Self - study time	85 h	
Total Learning hours	125 h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written Exercises	3	25%
Oral Presentation	0.5	25%
Examination	2	50%

Assessment Criteria:

- Written examination covering the theoretical content.
- Written exercises based on the practical study units (6 sessions x 0.5h/session = 3 hours).
- Group oral presentations about fieldwork, previously assigned by the academic staff (0.5 hours per group).

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

- M.A. Curran, *Life Cycle Assessment Handbook: A Guide for Environmentally Sustainable Products*. Ed. Wiley-Scrivener, (2012).
- A. Azapagic, R. Clift, S. Perdan, *Sustainable Development in Practice: Case Studies for Engineers and Scientists*. Ed. John Wiley and Sons, (2004).

The bibliographic resources from the University of Algarve libraries as defined by the professors and those available online at both universities.

Additional reading:

- UNE-EN ISO 14040:2006, *Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006)*.
- UNE-EN ISO 14044:2006, *Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006)*.

SBE366-P6. Integrated Aquaculture & Sustainable Fisheries

Course name: Integrated Aquaculture & Sustainable Fisheries			
Course Code: SBE-366-P6			
Field(s)/area(s) of study: Aquaculture systems; Physiology, Genetics and Genomics in aquaculture, Pathology in aquaculture; Aquatic ecosystem management; Sustainable fisheries management; Environmental impact assessment and Socio-economic aspects of fisheries.			
University coordinating the course: UAlg/UCA			
Participating universities:			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 75 % Online 25 %	Is it possible for students to follow the online sessions remotely?	Yes (only lectures)
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
In this course, students will learn the different aquaculture systems that exist in species of commercial interest (microalgae, plants, molluscs, crustaceans and fish), and the strategies to be taken into account in the cultivation of different species. The fundamental physiological and genetic bases for sustainable aquaculture will be studied, as well as the factors that can affect its production (abiotic and biotic factors, bottlenecks, pathologies, etc). Students should be able to identify environmental impacts of aquaculture and look for mitigation strategies. Also, students must learn the principles of sustainable fishing to avoid problems of overfishing, collapse of systems and by-catch, through the use of marine ecosystems in the fishing economy, the establishment of sustainable			

fishing policies and protected areas and the reduction, management and re-use of discards.

Course Content:

1. **Principles and concepts of aquatic organism production:** Types of aquaculture according to species, habitat, degree of intensity and production systems. Types and design of aquaculture facilities.
2. **Physiological bases of aquaculture:** Biotic and abiotic factors controlling physiological processes. Sensory physiology and biological rhythms. Fertilisation and development. Reproduction. Behaviour. Nutrition and metabolism. Stress and welfare.
3. **Genetics and genomics in aquaculture:** Genetic improvement techniques (selection, crossing, chromosome manipulation). Improvement by genetic engineering. Genetic and genome markers: Concept, types of markers. Applications. Gene mapping. Epigenetics in Aquaculture
4. **Pathology in aquaculture:** Introduction to pathology in aquaculture. Main diseases in aquaculture. Diagnosis of diseases in aquaculture. Control and prevention strategies. Vaccination types and strategies. Antibiotic resistance and alternatives.
5. **Environmental impact of aquaculture:** Problems of escapes and antibiotic use in aquaculture. Predator deterrents. Mitigation strategies. Integrated multi-trophic aquaculture.
6. **Introduction to fisheries:** History and evolution of fishing. Importance of fishing in the economy and society.
7. **Types of fishing:** Artisanal and Industrial Fishing. Fishing methods. Impacts of fishing activities. Technological innovations in fishing.
8. **Sustainable fishing vs overfishing:** Concepts and Principles of Sustainable Fisheries. Impacts of overfishing: ecological consequences and socioeconomic impacts. Strategies for sustainable fisheries.
9. **Genetic and genome management of fish populations.** Gene flow between wild and captive populations and genetic structure. Environmental DNA. Seascape genetics.
10. **Fisheries and by-catch:** Discard reduction, management and re-use. Problems and causes of bycatch. Impacts of bycatch. Strategies for bycatch reduction. Management and reuse of discards.

Keywords: sustainable aquaculture, sustainable fisheries

Programme Learning Outcomes (PLOs):

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO7. Manage multidisciplinary data with cutting- edge capabilities in the blue industries.

PLO8. Provide a knowledge framework to reconcile conflicting uses of the ocean and its resources and enable long- term sustainable growth.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- Understanding of theories, concepts and principles relevant to the fields of aquaculture and fisheries,
- Identify the main bottlenecks for a sustainable aquaculture development and fisheries management,
- Be able to provide solutions to the main problems of aquaculture and fisheries through the knowledge acquired in class

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- Integrate the knowledge from all scientific disciplines to solve the main challenges for a sustainable aquaculture and fisheries.
- Plan and execute projects for aquaculture improvement and fisheries management in a sustainable manner.

3. Autonomy & Responsibility: *Ability to utilise knowledge and skills in an independent manner in different situations.*

By the end of the course the student will be able to:

- Identify and weigh scientific and socio-environmental problems associated with aquaculture and fisheries activities; being able to make proposals for action to solve/mitigate these problems.
- Adapt to new situations, knowing how to apply and integrate their knowledge (techniques, scientific foundations, proposals, etc.) in any environment, both research and professional, multidisciplinary.

<ul style="list-style-type: none">- That students know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.- That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.		
Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)		
Method	Number of sessions	Duration
Lecture	10	3h x 10 = 30h
Fieldwork	2 (planta de cultivos/CTAQUA, lonja)	2h x 2= 4h
Practical Study-Unit	2	3h x 2 = 6h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods: <i>The examination regulations and the assessment of the achieved learning outcomes should correspond with the intended learning outcomes. They should be applied consistently among partner institutions. *When the assessment of a course consists of two or more components, the % weighting for each component is to be clearly indicated.</i>		
Link to pdf with definitions of assessment methods (separate document). Teachers can add more rows if needed.		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination	2h	20%
Case Study (take home)	10h (5h each)	40% (20% each case)
Practical study unit written exercises	2h	20%
Fieldwork Report	3h	20%
Assessment Criteria:		
The examination will be a written exam with short and/or test questions		

Students will develop two different **cases of study**, one from aquaculture and the other from the fisheries units. In these cases, lecturers will propose a problem and students must solve it using what they have learned in class. The students will have to apply the knowledge acquired to perform a critical analysis and propose possible solutions to solve it.

Practical Study-Unit will be evaluated with a questionnaire about lab practice.

Fieldwork: Students must prepare a report about fieldwork.

Study materials/Course literature: (*hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.*)

Aquaculture

Adams, A., & Thompson, K. D. (2011). Development of diagnostics for aquaculture: challenges and opportunities. *Aquaculture Research*, 42(s1), 93-102.

Benfey, T. J., Farrell, A., Brauner, C., (Eds.). 2020. Aquaculture. Fish Physiology Book Series. Volume 38 - 1st Edition, Academic Press. Elsevier. 364 p. Hardback ISBN: 9780128207949. eBook ISBN: 9780128226568.

Cabello, F. C., Godfrey, H. P., Tomova, A., Ivanova, L., Dolz, H., Millanao, A., & Buschmann, A. H. (2013). Antimicrobial use in aquaculture re-examined: its relevance to antimicrobial resistance and to animal and human health. *Environmental Microbiology*, 15(7), 1917-1942.

Currie, S., Evans, D. H. (Eds.) The Physiology of Fishes. 5th Edition. CRC Press. Boca Raton. eBook ISBN 9781003036401. 256 p.

Dunham RA, 2004. Aquaculture and fisheries biotechnology. Genetic approaches. Ed. CABI Publishing, Wallingford, UK. 372 p.

Gjedrem, T., 2005. Selection and Breeding Programs in Aquaculture. Springer, Dordrecht, 364 pp.

Gjedrem, T. and Baranski, M., 2009. Selective Breeding in Aquaculture: An Introduction. Springer, Dordrecht, 221 pp.

Kibenge, F. S. B., Baldisserotto, B., Chong, R. S.-M. 2022. Aquaculture Pathophysiology: Volume I. Finfish Diseases: 1. Academic Press. ISBN 13: 978-0128122112. 880 p.

Kibenge, F. S. B., Baldisserotto, B., Chong, R. S.-M. 2022. Aquaculture Pathophysiology: Volume II. Crustacean and Molluscan Diseases: 2. Academic Press. ISBN 13: 978-0323954341. 694 p.

Kocher TD & Kole C, 2008. Genome mapping and genomics in fishes and aquatic animals. Ed. Springer, Berlin. 180 p.

Peñalosa Martinell, D., Vergara-Solana, F. J., Araneda Padilla, M. E., Aranceta Garza, F. (Eds.). 2024. An Introduction to Sustainable Aquaculture. Routledge, London. eBook ISBN9781003174271. 358 p.

Roberts, R. J. (Ed.). (2012). *Fish Pathology* (4th ed.). Wiley-Blackwell.

Tucker, C. S., Lucas, J. S., Southgate, P. C. (Eds.). 2019. *Aquaculture: Farming Aquatic Animals and Plants*, 3rd Edition. Wiley-Blackwell. ISBN: 978-1-119-23086-1. 672 p.

Fisheries

Berkes, F., Mahon, R., McConney, P., Pollnac, R., & Pomeroy, R. (2001). *Managing Small-Scale Fisheries: Alternative Directions and Methods*. International Development Research Centre.

FAO. (2016). *The State of World Fisheries and Aquaculture 2016: Contributing to Food Security and Nutrition for All*. Food and Agriculture Organization of the United Nations.

Hall, M. A., Alverson, D. L., & Metuzals, K. I. (2000). *By-Catch: Problems and Solutions*. Marine Pollution Bulletin, 41(1-6), 204-219.

Hilborn, R., & Hilborn, U. (2012). *Overfishing: What Everyone Needs to Know*. Oxford University Press.

Holm, P., & Smith, T. D. (2017). *The Exploited Seas: New Directions for Marine Environmental History*. Liverpool University Press.

Kelleher, K. (2005). *Discards in the World's Marine Fisheries: An Update*. FAO Fisheries Technical Paper.

McGoodwin, J. R. (2001). *Understanding the Cultures of Fishing Communities: A Key to Fisheries Management and Food Security*. FAO Fisheries Technical Paper.

Olsen, P., & Toppe, J. (2017). *Fish, Technology, and Knowledge: Time for a New Development Paradigm in Fisheries Management*. FAO Fisheries and Aquaculture Technical Paper.

Pauly, D., & Zeller, D. (Eds.). (2016). *Global Atlas of Marine Fisheries: A Critical Appraisal of Catches and Ecosystem Impacts*. Island Press.

SBE367-P6. Marketing & Product Development in Blue Tourism

Course name: Marketing and Product Development in Blue Tourism			
Course Code: SBE367-P6			
Field(s)/area(s) of study: Management			
University coordinating the course: University of Algarve			
Participating universities: University of Cádiz and University of Algarve (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	Not applicable		
Short course description:			
<p>This course is designed to provide students with in-depth training in marketing strategies specific to blue tourism. Participants will explore from the initial conceptualisation phase to product and service development, including the final stages of marketing and communication. The process encompasses critical pricing and distribution decisions, ensuring a complete understanding of the strategic marketing cycle.</p> <p>Students will learn to apply advanced market research methodologies and design thinking, considering essential aspects such as eco-design and sustainability in the blue economy. Throughout the course, fundamental topics such as understanding marketing management, developing new</p>			

opportunities, marketing strategies and analysing the marketing environment will be covered.

Students will delve into:

Customer Information and Consumer Behaviour: Strategies for gaining valuable insights about customers and understanding consumer markets and buying behaviour.

Customer-oriented marketing strategy: Implement the STP (Segmentation, Targeting, Positioning) model and branding development.

Blue Tourism Market Offer Configuration: Design and manage products and experiences that create significant value for the customer.

Communication and Distribution: Development of effective pricing strategies, optimisation of distribution channels and design of integrated marketing strategies.

In addition, students will undertake practical projects that seek to develop tourism products and experiences, focusing on integrating health, physical activity and other sustainable activities related to the sea. This practical approach complements the theoretical knowledge acquired in the first and second year, preparing students to develop and execute effective marketing plans within Blue Tourism.

Related 1st and 2nd year courses: Sustainable Blue Entrepreneurship and Innovation (SBE203).

Course Content:

- I. Understanding the marketing management for Blue Tourism
- II. Developing Marketing opportunities and strategies for blue tourism
 - a. Marketing environment
 - b. Customer Information to Gain Customer Insights
 - c. Consumer Markets and Consumer Buying Behavior
- III. Customer-driven Marketing Strategy for Blue Tourism
 - a. STP model (segmentation, targeting, positioning)
 - b. Branding
- IV. Shaping the Market Offerings in Blue Tourism
 - a. Building Customer Value: Designing and managing products and experiences
 - b. Understanding and capturing customer value: Developing pricing strategies
 - c. Delivering Customer value: distribution channels
 - d. Communicating value: designing integrated marketing strategies

V. Marketing Plan
<p>Keywords: Marketing, customer-driven marketing, consumer behaviour, Product development, blue tourism, experience design, sustainability communication</p>
<p>Programme Learning Outcomes (PLOs): <i>Please, delete those that do not fit with the course content.</i></p> <p>PLO5. Identify the different economic actors and stakeholder groups in blue industries.</p> <p>PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.</p> <p>PLO10. Develop awareness of environmental and socio-economic problems related to the blue economy based on ethical commitment and sustainability.</p>
<p>Course Learning Outcomes (CLOs):</p> <p>1. <u>Knowledge</u>: <i>knowledge is described as theoretical and/or factual.</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> - To understand the marketing concept and process; - To understand consumer behaviour as a key input in Marketing Management; - To understand the specificities of product and experience design in Blue Tourism. <p>2. <u>Skills</u> (know-how): <i>Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).</i></p> <p><u>By the end of the course the student will be able to:</u></p> <ul style="list-style-type: none"> - to develop the skills necessary to understand the environment in which organisations operate and consumer behaviour; - to design strategies appropriate to the target consumers; - to know the variables of the Marketing Mix and design the respective (integrated) strategies.; - To master product design processes; - To make decisions aligned with consumers' needs and sustainable principles in Blue Tourism contexts; - To develop a responsible communication campaign. <p>3. <u>Autonomy & Responsibility</u>: <i>Ability to utilise knowledge and skills in an independent manner in different situations.</i></p> <p><u>By the end of the course the student will be able to:</u></p>

<ul style="list-style-type: none">- Search for relevant data to support the decision-making in marketing for blue tourism;- Develop products and experiences guided by sustainable principles in Blue Tourism contexts;- Develop a marketing plan for blue tourism.		
Teaching and Learning Methods. Course activities/Study Loads (<i>workshops, lectures, seminars, field trips, etc.</i>)		
Method	Number of sessions	Duration
Lecture	10	20h
Practical study-units	10	20h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	
Assessment Methods		
Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Examination (individual)	1h	50%
Case study (exam conditions)	4h	50%
Assessment Criteria: Classes follow the theoretical/practical format. The course adopts both teacher and student-centred teaching/learning methods. Practical cases are to be analysed and discussed. Informed decision-making is stimulated. A minimum of 75% attendance is required.		
Assessment model: .- Individual written assessment to take place on the regular season exam date (weighs 50%; a minimum score for approval in this component is set). .- Group assignment (50%). .- Re-sit/improvement exams: 100% (check regulations and calendar).		
Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, etc.)		

Brito, M., Dias, A., Patuleia, M. (2019). *Managing, Marketing, and Maintaining Maritime and Coastal Tourism (Advances in Hospitality, Tourism, and the Services Industry)*. Business Science Reference.

Kotler, P., Bowen, J., and Baloglu, S. (2020). *Marketing for Hospitality and Tourism*. Global edition, Pearson Education.

Kotler, P. and Keller (2021). *Marketing Management*. Global Edition. 16 Ed. Pearson

SBE368-P6. Seafood Processing & Product Development

Course name: Seafood Processing and Product Development			
Course Code: SBE368-P6			
Field(s)/area(s) of study: Food processing, environmental sciences, biology, occupation health and safety.			
University coordinating the course: University of Algarve			
Participating universities: University of Algarve/University of Cádiz (tbc)			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites	It is advisable that students have successfully completed the first- and second-year courses, with a particular focus on the subjects SBE 109 Blue Business Management, SBE 203 Sustainable Blue Entrepreneurship and Innovation, SBE205 Blue Circular Economy and SBE210 Environmental Accounting. Knowledge of blue industries (SBE 209. Introduction to Blue Industries) and seafood diversity (SBE 101 Marine Ecosystems and Biodiversity)		
Short course description:			
According to the Food and Agriculture Organization (FAO), fresh seafood represents 40.5% of the world's seafood production, while processed products (frozen, cured, canned, etc.) represent 45.9%, and this percentage is expected to increase. In the present course, students would explore aspects related to			

main processes and technologies associated with seafood processing in the context of the Blue Sustainable Economy. Quality and quality changes assessment of fish products. Fish processing. Minimal processed fish. Chilling, super-chilling, freezing process. Preservation of Fish by Curing (drying, salting, and smoking). Minimal heat fish processing. Fish-based fermented products. Processing of low-value fish, by catch and by-products. Clean fish processing technologies. Fish waste management. Best Available Techniques (BAT). New Product development (trends, low salt, sustainable seafood products, use of seaweeds and seaweed extracts in NPD). Food safety management in seafood processing industries.

Course Content:

The course aims to introduce the fundamental principles and processes of fish processing technology within the context of the blue and circular economy. In this regard, the course content will first address the nutritional and physicochemical composition of marine products, as well as the changes that occur after catch or slaughter affecting both their freshness and quality. Subsequently, the main transformation and preservation processes involved in food industries derived from the marine environment will be addressed: minimally processed products, fish preservation through cold application (refrigeration and freezing), fish industry preservation through curing (drying, salting, and smoking), heat-intensive processing such as fish and seafood canning, fermented products, as well as emergent trends and advances in processing, production, and development of marine products aiming at the utilisation of raw materials (seaweeds, microalgae, discards, etc.), by catch and by-products (and/or wastes) from the fish processing industry to promote circular economy. Quality assurance: quality control (parameters and methods), regulations, standardisation, certification and quality management systems.

Keywords: Fish processing technologies, seafood processing industries Circular economy, fish preservation, fish freshness and quality

Programme Learning Outcomes (PLOs):

PLO1. Have a general knowledge of the fundamental principles of marine sciences and the fundamental principles of sustainable blue economy.

PLO2. Identify and understand the interdependency of marine ecosystems, ocean industries, and societies that depend on them, with a wide socio-ecological perspective.

PLO3. Identify and interpret challenges that come with the increase in the economic value of the oceans and the increasing threats on the oceans.

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO9. Analyse policies and mechanisms that facilitate sustainable use of the ocean and maximise benefits and value creation for current and future generations.

PLO10. Develop awareness of environmental and socio-economic problems related to blue economy based on ethical commitment and sustainability.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- (1) *Understanding the chemical composition of fishery products and their physicochemical changes during different technological transformation and preservation processes.*
- (2) *Understanding the importance of raw materials, the transformation process, and preservation in obtaining a product with specific physicochemical and organoleptic characteristics.*
- (3) *Understanding the fundamentals of food industries derived from the marine environment, as well as the freshness and quality standards applied to the production and commercialization of fishery and aquaculture products.*
- (4) *Knowing the potential for harnessing marine resources and by-products from fishing and fish processing industries as food and/or food ingredients.*
- (5) *Understanding the ways for utilising marine resources and by-products, as well as the importance of waste management in the food industry in the context of Circular and Blue Economy.*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

Soft skills: *Critical thinking, decision-making, problem-solving, teamwork, goal setting, Have initiative and entrepreneurial character, ethical commitment, and communication.*

Advanced skills:

- (1) *Demonstrating the ability to relate concepts and themes.*
- (2) *Apply theoretical knowledge to laboratory and field practices.*
- (3) *Interpret data, formulate hypotheses, and draw conclusions.*
- (4) *Acquire familiarity with the methodology for searching bibliographic sources and accessing documentation.*
- (5) *Analyze and process information obtained from various sources.*

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- (1) Determining the freshness and quality of seafood using various methodologies and techniques.
- (2) Determining the food use of seafood, by catch and by-products based on their composition, technological properties, and functionalities.
- (3) Understanding and implementing the development and valorization of seafood in the context of Circular and Blue Economy.
- (4) Understanding and implementing the valorisation of the industrial seafood waste in the context of Circular and Blue Economy.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lecture	14	14 sessions x 2h/session)= 28 h
Performance	2	2 sessions x 2h/session= 4 h
Practical Study-Unit	4	4 sessions x 2h/session= 8 h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Written and Problems Exercises		15%
Multiple choice tests		15%
Oral Presentation combined with peer-assessment.		10%
Examination		60%

Assessment Criteria:

Study materials/Course literature: (hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)

Obligatory literature:

- Hall, G.M. (Ed.). Fish Processing Technology. Ed. Springer Science & Business Media (1997).
- Borda, D.; Nicolau, A.I.; Raspor, P. (Eds.). (2017) Trends in Fish Processing Technologies. Reino Unido: CRC Press.
- Bozialis, I.S. (Ed.). (2014). Seafood Processing: Technology, Quality and Safety. Grecia: Wiley.
- Mishra, R. (2022). Handbook on Fish Processing and Preservation. (n.p.): Taylor & Francis.
- Majumder, A.K., Balange, R.K. (Eds.). (2022). Advances in Fish Processing Technologies: Preservation, Waste Utilization, and Safety Assurance. (n.d.). Reino Unido: Apple Academic Press.
- Renata Tomczak-Wandzel, Eilen Arctander Vik and Tomasz Wandzel (2015) BAT in fish processing industry. Nordic perspective. ISBN 978-92-893-4315-2 (PDF) <http://dx.doi.org/10.6027/TN2015-566> (<https://norden.diva-portal.org/smash/get/diva2:851619/FULLTEXT02.pdf>)

Recommended (optional) literature:

- Galanakis, C.M. (2021) Sustainable Fish Production and Processing. (2021). Países Bajos: Elsevier Science.
- Gokoglu, N., Yerlikaya, P. (2015). Seafood Chilling, Refrigeration and Freezing: Science and Technology. Alemania: Wiley.
- Marianski, S. Marianski, A. (2014). Curing And Smoking Fish. Bookmagic LLC.
- Flick, G. J. (2012). The Seafood Industry. Suiza: Springer US.
- Bush, S., Oosterveer, P. (2019). Governing Sustainable Seafood. Reino Unido: Taylor & Francis.
- Seafood Science: Advances in Chemistry, Technology and Applications. (2014). Estados Unidos: CRC Press.

Links to self-study sources:

References from scientific journals related with Fish-Processing: Fisheries Science, Fisheries Research, Journal of FisheriesSciences.com, Fishes (MDPI), etc. Some of them are presented below.

- M.C. Barros, A. Magán, S. Valiño, P.M. Bello, J.J. Casares, J.M. Blanco (2009). Identification of best available techniques in the seafood industry: a case study, Journal of Cleaner Production, Volume 17, 391-399. <https://doi.org/10.1016/j.jclepro.2008.08.012>.
- Russo, G.L.; Langellotti, A.L.; Torrieri, E.; Masi, P. (2023). Emerging technologies in seafood processing: An overview of innovations

reshaping the aquatic food industry. Comprehensive reviews in Food Science and Food Safety, 23: e13281. <https://doi.org/10.1111/1541-4337.13281>

- Komlatsky et al. (2019). Automation technologies for fish processing and production of fish products. Journal of Physics: Conference Series, Volume 1399, Issue 4. <https://doi.org/10.1088/1742-6596/1399/4/044050>
- Ravishankar, C.N., Elavarasan, K. (2023). Innovations in Fish Processing Technology. In: Bansal, K.C., Lakra, W.S., Pathak, H. (eds) Transformation of Agri-Food Systems. Springer, Singapore. https://doi.org/10.1007/978-981-99-8014-7_16

SBE369-P6. Blue Industries Project Management

Course name: Blue Industries Project Management			
Course Code: SBE369-P6			
Field(s)/area(s) of study: Business Administration, Operations Management, Information Technology, Finance			
University coordinating the course: University of Cadiz			
Participating universities: tbd			
Total ECTS:	5 ECTS	Language of instruction:	English
Mode of Delivery:	Onsite 70% Online 30%	Is it possible for students to follow the online sessions remotely?	Yes
Course type:	Compulsory		
Total workload per ECTS Credit (25 hours)	1 ECTS is distributed as follows: Teaching contact hours (8h) + self-study time (17h).		
Name of Coordinating Lecturer:			
Co-lecturer/s (if any):			
Estimated Student Numbers:			
Pre-requisites			
Short course description:			
Blue Industries Project Management is a subject of practical application, ranging from strategic implementation and management of projects focused on competitiveness, change management, and innovation. The discipline provides a comprehensive approach to project management principles in the context of the Blue Industries. It equips students with skills to manage projects focused on sustainable development in the Blue Industries, particularly in the seafood sector and coastal tourism. The curriculum includes an overview of Project Management methodologies, introduction to the use of software tools, and discussion of real-world case studies for inspiration. The contents may help students to obtain internationally recognised Project Management Professional certification, such as those offered by the Project Management Institute (PMI), the International Project Management Association (IPMA) or the European Comission (EC).			

Course Content:

1. FUNDAMENTALS OF PROJECT MANAGEMENT

Introduction to Project Management.

Project Contexts.

Strategic Importance of Projects.

Innovation and Continuous Improvement.

2. PROJECT MANAGEMENT: PREDICTIVE APPROACH

Project management principles and life cycle. Integration management.

Key project components: scope, schedule, cost and project control, resources, communication, risk, procurement, quality, stakeholders.

Overview of Waterfall methodologies.

Tools and techniques for project control (Gantt charts, Earned Value Management).

3. PROJECT MANAGEMENT: ADAPTIVE OR AGILE APPROACH

Goals and objectives; Project Plan and the Work Breakdown Structure (WBS).

Agile Manifesto: Principles; Roles; Scrum Master, Team; Development, Product Owner; Agile Events; Adaptation.

Overview of Agile methodology (including Scrum and Kanban).

Comparison of Agile and Waterfall methodologies.

Adaptive project management techniques.

4. COMMUNICATION AND RISK MANAGEMENT

Project stakeholders and communication strategies.

Project risk responses. Contingency plan.

Monitoring and controlling risks in Waterfall projects.

Sprints, inspection, and adaptation in Agile projects.

5. SUSTAINABILITY AND PROJECT MANAGEMENT

Integrating sustainability into project management.

Environmental impact assessment and mitigation strategies.

Social and economic aspects in Project Management.

6. CASE STUDIES AND BEST PRACTICES

Analysis of real-world sustainable projects in the Blue Industries: lessons learned from successful projects.

Good practices for managing projects in marine and coastal contexts.

7. PROJECT MANAGEMENT SOFTWARE

Project management freeware for task organisation, project tracking, and collaboration, suitable for managing smaller projects, easy visualisation of tasks. Examples of free Project Management software tools: Trello (Preferred), Asana, ClickUp, Wrike, ActiveCollab, Airtable, Jira, Height.

Keywords: project management, stakeholders, strategy, risk

Programme Learning Outcomes (PLOs):

PLO4. Describe alternative economic approaches in addition to traditional economic analysis.

PLO6. To use marine environmental and socio-economic analysis tools, including data analysis.

PLO7. Manage multidisciplinary data with cutting-edge capabilities in the Blue Industries.

PLO11. To understand the impact of socio-economic activities linked to the marine environment with a focus on sustainability.

Course Learning Outcomes (CLOs):

1. Knowledge: *knowledge is described as theoretical and/or factual.*

By the end of the course the student will be able to:

- *Gain a comprehensive understanding of project management principles in the context of sustainable practices in the Blue Industries.*
- *Understand core project management concepts, including scope, time, cost, quality, and risk.*
- *Extract lessons from actual projects to improve project management practices.*

2. Skills (know-how): *Ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills).*

By the end of the course the student will be able to:

- *Describe several project management methodologies, such as Agile or Waterfall, recognizing their applicability in different types of projects.*
- *Develop a project management plan.*
- *Identify project stakeholders and prepare effective communication approaches.*
- *Incorporate sustainability principles into project management, focusing on environmental impact assessment and social responsibility.*

- Identify project risks and formulate mitigation strategies.
- Implement quality control to certify that deliverables meet required standards.

3. **Autonomy & Responsibility:** Ability to utilise knowledge and skills in an independent manner in different situations.

By the end of the course the student will be able to:

- Implement project plans and manage tasks and teams to achieve project goals.
- Monitor and evaluate project progress.

Teaching and Learning Methods. Course activities/Study Loads (workshops, lectures, seminars, field trips, etc.)

Method	Number of sessions	Duration
Lectures	10	20h
Project	6	12h
Tutorials	4	8h
Total teaching contact hours:	40h	
Self - study time	85h	
Total Learning hours	125h	

Assessment Methods

Method	Duration in hours or length in words (as applicable)	Percentage Weighting
Assignment	Up to 4,000 words	20%
Research Project	Up to 9,000 words	40%
Case Study (Take Home)	Up to 3,000 words	30%
Classwork	12h	10%

Assessment Criteria:

1. Assignment (20%): Students will work in groups to create a project proposal that outlines a new initiative within the Blue Industries. This proposal should include project goals, scope, key stakeholders, estimated timeline, and expected outcomes.

2. Research Project (40%): A comprehensive project management plan for the group's proposed project. This plan should include a work breakdown structure

(WBS), a Gantt chart for project scheduling, a risk management plan, and a communication plan.

3. Case Study (Take Home) (30%): an individual case study related to an actual sustainable blue industry project, reflecting on the challenges and solutions presented in the case.

4. Classwork (10%): Attendance and active participation in class discussions and practical sessions.

Study materials/Course literature: *(hand-outs and reader; obligatory literature; links to self-study sources; literature database; links to relevant websites; short video clips; recommended (optional) literature, ...)*

International Project Management Association (IPMA). (2015). Individual Competence Baseline for Project Management (ICB) (4th ed.). IPMA.

International Project Management Association. (2018). IPMA Reference Guide ICB4 in an Agile World (2nd ed.). International Project Management Association.

Project Management Institute (PMI). (2021). A guide to the Project Management Body of Knowledge (PMBOK guide) (7th ed.). PMI.

TeamWork.com (2024, May 11). The Teamwork.com guide to project management, <https://www.teamwork.com/project-management-guide/project-management-methodologies>

Watt, A. (2014). Project management. BCcampus.
<https://opentextbc.ca/projectmanagement/>

Wrike (2024, May 11). Project Management Guide for 2024, <https://www.wrike.com/project-management-guide/>