EU-CONEXUS
Online Micro-credentials in Smart Urban Coastal Sustainability
- Catalogue

Spring 2025/2026

version 1.0

The table below presents all the courses that will be offered in a synchronous teaching mode in Spring semester of academic year 2025/2026.

Sector	Thematic area	Micro-credential title	Starting month	ECTS	Application dates	Delivery mode	Host university
Coastal	**Anatomy of coastal areas**	Build with nature - techniques for sandy coasts	April 2026	1	16.02-18.03.2026	Online	Klaipeda University, Lithuania
	Coastal risks and protection	Spatial planning and climate risk mitigation for resilient coastal areas	April 2026	1	16.02-18.03.2026	Online	Frederick University, Cyprus
	Water management	Environmental monitoring and indicators	April 2026	1	16.02-18.03.2026	Online	Agricultural University of Athens, Greece
	Ecosystem services	Marine ecosystem services and the impact of the Invasive Alien Species in the Mediterranean Sea	May 2026	1	16.02-19.04.2026	Online	Agricultural University of Athens, Greece
	Smart ports	Cybersecurity for smart ports & shipping organizations	May 2026	1	16.02-19.04.2026	Online	Klaipeda University, Lithuania
European	**Blue economy**	Entrepreneurship in Blue Economy	April 2026	1	16.02-18.03.2026	Online	University of Rostock, Germany
Smart	**Digital humanities**	System thinking and system dynamics modelling	April 2026	1	16.02-18.03.2026	Online	Klaipeda University, Lithuania
	Big Data Science	Essentials of Power BI Data Visualisation and Modelling	April 2026	1	16.02-18.03.2026	Online	University of Rostock, Germany
	Cognitive systems and neuroscience	Neurociencia e inteligencia artificial	April 2026	1	16.02-18.03.2026	Online (in Spanish)	Catholic University of Valencia, Spain
	Digital humanities	Data Visualization	May 2026	1	16.02-19.04.2026	Online	La Rochelle Université, France

Smart	**Digital humanities**	Using AI when working with very large document collections: opportunities and risks	May 2026	1	16.02-19.04.2026	Online	La Rochelle Université, France
	Sustainable IT	UAS principles, data modelling and analysis	May 2026	1	16.02-19.04.2026	Online	Technical University of Civil Engineering Bucharest, Romania
Sustainability	**Social Entrepreneurship and Commitment**	Social Entrepreneurship and Commitment in Smart Urban Coastal Sustainability	May 2026	1	16.02-19.04.2026	Online	University of Rostock, Germany
University	**Research and innovation thinking**	Research and Innovation Thinking	April 2026	1	16.02-18.03.2026	Online	Klaipeda University, Lithuania
	Smart learning	Tools for data analytics	April 2026	1	16.02-18.03.2026	Online	Klaipeda University, Lithuania
	Professional communication and academic writing	Ludic Chinese language learning method with tactile HYPA keyboard	April 2026	1	16.02-18.03.2026	Online	La Rochelle Université, France
	Ethics/Bioethics	Animal welfare in research labs	May 2026	1	16.02-19.04.2026	Online	Agricultural University of Athens, Greece
Urban	**Internet of things**	IoT Cloud for Digital Twins	April 2026	1	16.02-18.03.2026	Online	University of Rostock, Germany

Apply here 😊

Below you will find **Micro-credential Cards** that include descriptions of each one of them together with the **timetables**.

They are arranged according to the date of starting the classes.

System thinking and system dynamics modelling

(link to the website and registration platform available here)

Professor's name, university & email	Vitalij Denisov, Klaipeda University (Lithuania) vitalij.denisov@ku.lt
Sector	Smart
Thematic area	Digital humanities
EQF level	Level 6 (Bachelor)
ISCED-F field	0688 - Inter-disciplinary programs and qualifications involving information and Communication Technologies
ESCO skills & competences	T2.1 – transversal skills and competences – thinking skills and competences - processing information, ideas and concepts S2.7.0 – skills – information skills - analysing and evaluating information and data S5.6.0 – skills – working with computers – using digital tools for collaboration, content creation and problem solving K0688 – knowledge – information and communication technologies (ICTS) - inter-disciplinary programmes and qualifications involving information and communication technologies (ICTS)
Proposed dates of the classes	Fridays, 03/04, 17/04, 24/04, 08/05, 15/05, 14:00-16:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	To be announced
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	This micro-credential aims to develop intuition for systems thinking and more formal skills in modeling systems dynamics. It enables students to define a problem and formulate the system under study, as well as to develop their own computer models of system dynamics for various phenomena and processes in various fields of knowledge and application areas. When applied in the humanities and social sciences, the course also aims to bridge the gap between the descriptive approach used in the social sciences and the formal approach typically used in the natural sciences. Being proposed as an approach for managing complexity, the systems thinking provides a tool to help analysts, policy and decision makers understand the cause-

	and-effect relationships among data, information, and people, i.e., the main constitutes of the modern knowledge-based society. It, therefore, improves individual and collective decision making by focusing attention on the causes of problems and potential changes needed to produce better results. Also, system dynamics approach helps linking the knowledge that students have already acquired while studying different disciplines.
Description of the content (week by week)	Unit 1. Concept of a system, systems and models (2 hours: lecture): – System approach. Definition of a system. System analysis principles. Systems thinking and system dynamics approach. – From systems to their models. Model types, mathematical and simulation models. Dynamic models. – Model development procedure and techniques. Causal loops and stock and flow diagramming methods. Unit 2. Model design in a simulation system (2 hours: lecture and practical work) – Modeling systems (simulators). – Model design in a simulation system using stock and flow diagrams. – Running created models (model simulation). Unit 3. Models of growth and decline (2 hours: lecture and practical work) – Growth laws. Formulation of assumptions of growth models. – Numerical implementation of models. Unit 4. More complex models: (2 hours: lecture and practical work). – Models of interactions. Different types of interactions: predator-prey, competition, etc. – Presentation of modelling results. Phase portrait of a system. Unit 5. Spread and diffusion models (2 hours: lecture and practical work). – Epidemic models. Innovation and product diffusion models. – Summary of the course, duscussion and model portfolio formation.
Importance for society	Rapid changes in all spheres of our lives complicate the world. As recent WEF reports highlight, megatrends such as the emergence of a global economy, rapid urbanization, technological breakthroughs, climate change, and resource scarcity are shaping a whole new set of global risks for which our society must be better prepared. Systems thinking is often referred to as the “cognitive skill of the 21st century” because it is important to learn a new way of thinking about this ever-changing, increasingly complex world and equip students with the analysis and modeling skills they need to succeed in their future lives.
Skills (hard and soft skills)	Hard skills: – System dynamics diagramming methods – Design & application of simulation models Soft skills: – Creative & critical thinking – Problem solving
Sustainable Development Goals	SDG4: Quality education SDG8: Decent work and economic growth SDG11: Sustainable cities and communities

	SDG12: Responsible consumption and production			
Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements/format**	**Supervision and identity verification during assessment**
Demonstrate fresh knowledge of systems analysis principles and deep under-standing of the system dynamics approach and its application to the development of conceptual and simulation models	Lectures, discussions	Online Quiz	Time-limited quiz in the virtual learning environment Moodle: 10-questions of different type	Supervised online with login-based identity in Moodle
Prepare new & apply existing computer-based simulation models using stock and flow and causal loop diagrams in a simulation system	Presentations, diagramming, simulation of real-life situations, problem-based learning	Portfolio	Individual work. Submission of portfolio in Moodle in the form of individually developed system dynamics models in a chosen simulation system	Unsupervised online submission of portfolio in Moodle with login-based identity verification
Bibliography	**Books:** 1. Meadows, D. Thinking in systems. A Primer. Edited by D. Wright, Sustainability Institute. Earthscan: London. 2009. 218 p. ISBN: 978-1-84407-726-7 2. Bossel, H. Systems and Models: Complexity, Dynamics, Evolution, Sustainability. Norderstedt, Germany: BoD - Books on Demand, 2007. ISBN 9783833481215. 3. Borshchev, A. The Big Book of Simulation Modeling: Multimethod Modeling with Anylogic 6. AnyLogic North America, 2013, 614 p. 4. Grigoryev, I. AnyLogic 8 in Three Days. A quick course in simulation modeling. Fifth edition, 2023. 252 p. **Publications/articles:** 1. Sarah York, Rea Lavi, Yehudit Judy Dori, and MaryKay Orgill. Applications of Systems Thinking in STEM Education. // J. Chem. Educ. 2019, 96, 12, p. 2742–2751. https://doi.org/10.1021/acs.jchemed.9b00261 2. Sakalauskas L, Denisov V, Dirzyte A. Hybrid Modeling of Anxiety Propagation in Response to Threat Stimuli Flow. // Mathematics. 2023; 11(19):4121. https://doi.org/10.3390/math11194121 3. A system dynamics glossary. Compiled by David N. Ford. // Syst. Dyn. Rev. 35, 369–379 (2019). https://doi.org/10.1002/sdr.1641 **Websites:**			

	1. The System Thinker. System Thinking: What, Why, When, Where, and How? By Michael Goodman. https://thesystemsthinker.com/systems-thinking-what-why-when-where-and-how/ 2. Systems thinking: https://en.wikipedia.org/wiki/Systems_thinking 3. What is System Dynamics? https://www.uib.no/en/rg/dynamics/39282/what-system-dynamics 4. Stella Online. Powerful modeling and diagramming capabilities in any web browser: https://www.iseesystems.com/store/products/stella-online.aspx 5. AnyLogic: Simulation Modeling Software Tools and Solutions. https://www.anylogic.com/ 6. AnyLogic Personal Learning Edition (PLE) download: https://www.anylogic.com/s/download-free-simulation-software-for-education/

Essentials of Power BI Data Visualisation and Modelling

(link to the website and registration platform available here)

Professor's name, university & email	Gabriele Doblhammer, University of Rostock, gabriele.doblhammer@uni-rostock.de
Sector	Smart
Thematic area	Big Data Science
EQF level	Level 6 (Bachelor)
ISCED-F field	0613 software and applications development and analysis
ESCO skills & competences	K041 – Big Data Modelling & Visualization – Data Science S5.1.0 – Understanding Essentials of Microsoft Power BI - create charts, report & dashboard and modelling using Power BI
Proposed dates of the classes	06/04, 08/04, 10/04, 13/04, 15/04, 24/04, 12:00-14:00 (CET)
One hour for tutoring consultations	22/04, 12:00-14:00 (CET)
Date of the exam/ final assessment	24/04, 12:00-14:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 12 h Asynchronous hours & self-directed learning: 13 h
General description	Microsoft Power BI has evolved rapidly over the past few years, moving from a basic business-intelligence tool into a powerful, cloud-based analytics platform. It now supports real-time data processing, interactive dashboards, artificial intelligence–driven insights, and seamless integration with tools like Excel and cloud services. This evolution reflects a broader global shift toward data-driven decision-making, where organizations increasingly rely on visual, easy-to-understand reports to interpret complex data. Power BI has become a trending topic because businesses generate massive volumes of data and need fast, accessible tools to turn that data into actionable insights. Its self-service features allow even non-technical users to explore and visualize information, which has accelerated its adoption across industries. It is important for students to gain knowledge of Power BI because it builds essential data literacy skills that are highly valued in today's job market. Learning this tool helps students understand how to collect, clean, analyze, and present data effectively, which is useful across fields such as business, engineering, healthcare, and social sciences. Power BI also provides practical, hands-on experience with real-world datasets, helping students connect theoretical concepts to real applications. By mastering Power BI, students improve their problem-solving abilities and enhance their career prospects,

	as many employers seek graduates who can make sense of data and communicate insights clearly.
Description of the content (week by week)	Unit 1. Introduction to Power BI and Data Visualization Basics (2 hours) Unit 2. Data Cleaning and Transformation with Power Query (2 hours) Unit 3. Building Interactive Dashboards and Reports (2 hours) Unit 4. Data Modeling and DAX Fundamentals (2 hours) Unit 5. Real-World Projects and Best Practices in Power BI (2 hours) Unit 6. Exam (2 hours)
Importance for society	Learning Power BI is significant for society because it promotes a culture of data-driven thinking and more informed decision-making. When people understand how to analyze and visualize data, they are less likely to rely on assumptions, misinformation, or biased interpretations. This skill helps individuals, organizations, and governments make fairer and more transparent decisions in areas such as healthcare, education, business, and public policy. By turning complex data into clear visual stories, Power BI supports greater accountability and trust, as people can better understand how decisions are made and what evidence supports them. Power BI also raises awareness and attention toward critical social, economic, and environmental issues by making trends and patterns visible and easy to interpret. Interactive dashboards can highlight inequalities, resource distribution, climate impacts, public health trends, and financial transparency, encouraging more responsible behavior at both individual and institutional levels. As more people learn tools like Power BI, society becomes more attentive to ethical data use, privacy, and the importance of evidence-based discussions, fostering a more informed and engaged public.
Skills (hard and soft skills)	Hard skills: Data visualization and dashboard creation in Power BI, Data cleaning and transformation using Power Query Soft skills: Analytical thinking and problem-solving, Communication of insights through clear data storytelling
Sustainable Development Goals	SDG3. Good health and well-being SDG4. Quality education SDG9. Industry, innovation and infrastructure SDG13. Climate action

Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements/format**	**Supervision and identity verification during assessment**
Students will be able to import, clean, and transform raw data and create interactive	Presentation, lecture, discussions, group work, projects, case studies etc.	projects, presentations prepared by students, quiz, written exam	group work, individual work, projects Requirements: work in pairs, presentation in front of the colleagues	supervised online with identity verification.

dashboards and visual reports using Power BI.		and attendance		
Students will be able to analyze data using basic DAX functions and clearly communicate data-driven insights for practical decision-making.				
Bibliography	Books: 1. https://learn.microsoft.com/en-us/power-bi/transform-model/desktop-quickstart-learn-dax-basics 2. https://dax.guide/ 3. https://learn.microsoft.com/en-us/power-bi/ 4. Publications/articles: 1. https://learn.microsoft.com/en-us/power-bi/guidance/whitepapers 2. https://www.jqst.org/index.php/j/article/view/117 3. https://www.sciencedirect.com/science/article/pii/S2666557325000308 4. https://ijisae.org/index.php/IJISAE/article/view/3401 5. https://www.mdpi.com/2078-2489/14/11/614 Websites: 1. https://www.microsoft.com/en-us/power-platform/products/power-bi 2. https://learn.microsoft.com/en-us/power-bi/fundamentals/power-bi-overview https://learn.microsoft.com/en-us/training/powerplatform/power-bi			

Build with nature - techniques for sandy coasts

(link to the website and registration platform available here)

Professor's name, university & email	Loreta Kelpšaitė-Rimkienė, Klaipeda University (Lithuania) loreta.kelpsaite-rimkiene@ku.lt
Sector	Coastal
Thematic area	Anatomy of coastal areas
EQF level	Level 6 (Bachelor)
ISCED-F field	0521 Environmental sciences
ESCO skills & competences	K052 – knowledge – natural sciences, mathematics and statistics – environment - environmental sciences - coastal management S1.11.0 – skills - communication, collaboration and creativity - designing systems and products – designing systems and products T2.1 – transversal skills and competences – thinking skills and competences - processing information, ideas and concepts T2.3 – transversal skills and competences – thinking skills and competences - dealing with problems - identify and solve problems
Proposed dates of the classes	Tuesdays, 07/04, 14/04, 21/04, 28/04, 05/05, 13:00-15:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	05/05, 13:00-15:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	Coastal erosion is a natural process that can cause significant damage to coastal communities, including flooding, property loss, and infrastructure damage. According to Eurostat, in 2020, approximately 119 million people or 23% of the EU population, lived in Coastal areas and directly are affected by coastal erosion. One approach to mitigating the effects of coastal erosion is to use "Build with Nature" techniques, which involve working with natural processes to enhance coastal resilience. In this course, you will get knowledge about:

	• Natural processes that shape sandy coasts: This involves learning the dynamics of waves, tides, and currents, as well as the role of sediment transport in shaping beaches and dunes. • Coastal hazards and vulnerabilities: This involves learning how to identify coastal areas at risk from erosion, flooding, and other threats and assess the potential impacts on human communities and natural ecosystems. • Designing and implementing "Build with Nature" solutions: This involves learning about different techniques for enhancing coastal resilience, such as beach nourishment, dune restoration, wetland creation, and oyster reef construction.
Description of the content (week by week)	Unit 1. Introduction, Fundamentals of Coastal Processes (1 hour) Unit 2. Waves, Tides, Currents, and Sediment Transport in Coastal Zones (1 hour) Unit 3. Coastal Hazards: Identifying Vulnerable Areas (1 hour) Unit 4. Introduction to "Build with Nature" Techniques (1 hour) Unit 5. Title (number of hours) Beach Nourishment: Techniques, Benefits, and Limitations (1 hour) Unit 6. Dune Restoration and Wetland creation the Role of Vegetation in Coastal Defence (1 hour) Unit 7. Principles of Sustainable Coastal Development (1 hour) Unit 8. Stakeholder Engagement in Coastal Management (1 hour) Unit 9. Monitoring and Adaptive Management for Coastal Projects (1 hour) Unit 10. Exam (1 hour)
Importance for society	A course on "Build with Nature" techniques for sandy coast erosion mitigation is crucial for individuals and employers and holds significant importance for society. Here are several reasons why such a course is valuable for society. It enhances coastal resilience, protects communities, conserves ecosystems, promotes sustainable development, fosters stakeholder inclusivity, supports climate adaptation, preserves cultural heritage, ensures economic stability, and encourages global cooperation.
Skills (hard and soft skills)	**Hard skills:** Researching, Information processing, Interpreting **Soft skills:** Critical thinking, Problem-solving, Time management
Sustainable Development Goals	SDG6. Clean water and sanitation SDG9. Industry, innovation and infrastructure SDG11. Sustainable cities and communities SDG12. Responsible consumption and production SDG13. Climate actions SDG14. Life below water SDG15. Life on land

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements /format	Supervision and identity verification during assessment
Describe main coastal processes and recognise coastal risks to support sustainable resilience strategies.	Lectures	Written Exam (quiz)	Final exam, individual test	Supervised online or onsite with identity verification.
Collect and analyse data, develop effective problem-solving techniques with integration ethical and sustainable approaches to the coastal management practices.	Project-Based Learning (case study analysis), Discussions and Debates during the case study analysis presentation.	Based on the participation in discussions and Presentation of the group and/or individual work	Learners will collaborate in groups to complete projects or presentations. Deliverables may vary, including written reports, presentations, or multimedia.	Unsupervised with no identity verification
Bibliography	**Books:** 1. *Coastal Dynamics Open Textbook* Authored by Judith Bosboom and Marcel Stive, source: https://www.tudelft.nl/citg/over-faculteit/afdelingen/hydraulic-engineering/sections/coastal-engineering/coastal-dynamics-open-textbook 2. Dean RG, Dalrymple RA. *Coastal Processes with Engineering Applications*. Cambridge University Press; 2001. **Publications/articles:** 1. Vikolainen, V., Bressers, H. & Lulofs, K. A Shift Toward Building with Nature in the Dredging and Port Development Industries: Managerial Implications for Projects in or Near Natura 2000 Areas. Environmental Management 54, 3–13 (2014). https://link.springer.com/article/10.1007/s00267-014-0285-z 2. Korbee, D., Mol, A. P. J., & Van Tatenhove, J. P. M. (2014). Building with Nature in Marine Infrastructure: Toward an Innovative Project Arrangement in the Melbourne Channel Deepening Project. Coastal Management, 42(1), 1–16. https://www.tandfonline.com/doi/abs/10.1080/08920753.2013.863722 3. van Zetten, R., van der Meulen, F. and IJff, S. (2023), Building with Nature at the coast. Nordic Journal of Botany, 2023: e03663. https://nsojournals.onlinelibrary.wiley.com/doi/10.1111/njb.03663 4. Salet, W. (2014). Building with Nature. disP - The Planning Review, 50(1), 4–5. https://www.tandfonline.com/doi/abs/10.1080/02513625.2014.925714 5. van der Meulen, F., IJff, S. and van Zetten, R. (2023), Nature-based solutions for coastal adaptation management, concepts and scope, an			

overview. Nordic Journal of Botany, 2023: e03290. https://doi.org/10.1111/njb.03290
6. Morris RL, Konlechner TM, Ghisalberti M, Swearer SE. From grey to green: Efficacy of eco-engineering solutions for nature-based coastal defence. Glob Change Biol. 2018; 24: 1827–1842. https://onlinelibrary.wiley.com/doi/10.1111/gcb.14063

Websites:

1. https://www.ecoshape.org/en/the-building-with-nature-philosophy/
2. https://boskalis.com/about-us/company-profile/building-with-nature
3. https://www.iadc-dredging.com/subject/environment/building-with-nature/

Entrepreneurship in Blue Economy

(link to the website and registration platform available here)

Professor's name, university & email	Sabine Brüser, University of Rostock, Germany sabine.brueser@uni-rostock.de
Sector	European
Thematic area	Blue Economy
EQF level	Level 6 (Bachelor)
ISCED-F field	0413 Entrepreneurship
ESCO skills & competences	K0413 – knowledge – business, administration and law – business and administration - management and administration S2.7.4 – skills – information skills – analysing and evaluating information and data - analysing business operations S4.1.1 – skills – management skills – developing objectives and strategies - identifying opportunities T2.4 – transversal skills and competences – thinking skills and competences - thinking creatively and innovatively
Proposed dates of the classes	Wednesdays, 08/04, 15/04, 22/04, 20/05, 27/05, 17:00-19:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	Deadline for submitting the exam (EU-CONEXUS Moodle): 03/06, 23:59 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	This micro-credential addresses the field of Blue Economy entrepreneurship and provides participants with the knowledge and skills to develop sustainable business models. The Blue Economy has rapidly gained momentum as a key driver of economic growth and environmental sustainability, attracting the attention of investors, policy makers and entrepreneurs alike. This growing interest is fuelled by the increasing recognition of the oceans' enormous potential for innovation and economic development, as well as the growing awareness of the urgent need to protect marine ecosystems. Students studying this subject will be well prepared to take advantage of the emerging opportunities in this dynamic sector, drive innovation and contribute to a more sustainable future for our oceans.

Description of the content (week by week)	Unit 1. Introduction to the Blue Economy and Sustainable Entrepreneurship (2 hours) Unit 2: From an idea to a sustainable company (2 hours) Unit 3: Research and Market Analysis (2 hours) Unit 4: Sustainable Business Model Canvas (1/2) (2 hours) Unit 5: Sustainable Business Model Canvas (2/2) (2 hours)			
Importance for society	This micro-certificate enables students to develop sustainable business models in the fast-growing blue economy sector. Participants will gain the knowledge and skills to tackle pressing environmental challenges while taking advantage of the economic opportunities our oceans offer.			
Skills (hard and soft skills)	Hard skills: Business Model Canvas, Market and SWOT Analysis Soft skills: Teamwork, Communication			
Sustainable Development Goals	SDG8. Decent work and economic growth SDG9. Industry, innovation and infrastructure SDG13. Climate action SDG14. Life below water			
Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements/format**	**Supervision and identity verification during assessment**
Recognise problems and opportunities related to the blue economy, develop creative solutions and conduct a market analysis to understand target groups and the competitive landscape.	Lectures, Discussion, Group Work, Individual Work, Presentations	Attendance, Evaluation of assignments	Group work, Individual work	Unsupervised with no identity verification
Develop creative solutions to identified problems and create a sustainable business model using the Sustainable Business Model Canvas.				

Bibliography	**Books:**

1. Borriello, Antonio, et al. "The EU blue economy report 2024." (2024).
2. Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. John Wiley & Sons.
3. Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2014). Value Proposition Design: How to Create Products and Services Customers Want. John Wiley & Sons.
4. Pauli, G. (2010). The Blue Economy: 10 years, 100 innovations, 100 million jobs. Paradigm Publications.
5. Froese, R., & Pauly, D. (Hrsg.). (2019). Blue growth: Innovation for a sustainable ocean economy. Cham: Springer.

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Co-funded by the European Union

Spatial planning for resilient coastal areas

(link to the website and registration platform available here)

Professor's name, university & email	Byron Ioannou, Frederick University (Cyprus) b.ioannou@frederick.ac.cy
Sector	Coastal
Thematic area	Coastal risks and protection
EQF level	Level 6 (Bachelor)
ISCED-F field	0731 Architecture and town planning
ESCO skills & competences	K0731 - knowledge - architecture and town planning - urban planning - spatial planning S4.1 - skills – management skills - developing objectives and strategies S2.7 – skills – information skills - analysing and evaluating information and data T2.1 – transversal skills and competences – thinking skills and competences - processing information, ideas and concepts
Proposed dates` of the classes	09/04, 16/04, 23/04, 06/05, 20/05, 18:00-20:00 (CET)
One hour for tutoring consultations	07/05, 18:00-19:00 (CET)
Date of the exam/ final assessment	20/05, 18:00-20:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	Spatial planning has a long tradition, especially in Europe as an institutional process of manifesting and coordinating development and resources of cities and regions. The current status of overdevelopment in coastal zones, along with the emerging climate crises has turned formal planning into a decisive parameter for economic and social robustness, as well as environmental conservation. Any expert interested in working at the public or governance sector needs to be aware of the barriers and enablers spatial planning may impose to the sustainable coastal areas perspective.
Description of the content (week by week)	Unit 1. What is Spatial Planning? (2 hours) Unit 2. Planning and development challenges and risks for coastal areas (2 hours) Unit 3. Typology and content of plans for coastal areas (2 hours) Unit 4. Comprehension a coastal plan resilience/ workshop (2 hours) Unit 5. Final assessment (2 hours)

Importance for society	Societies and local governments are usually emphasizing in short term actions and remedies for every aspect of their reality. Spatial planning as a long-term scope is often neglected or undecimated. Most of the barriers that sustainable coastal development phases have to do with the absence of proactiveness and long-term planning.
Skills (hard and soft skills)	Hard skills: Plan Assessment, Sustainability Comprehension Soft skills: Critical Thinking and Creativity, Analytical Skills
Sustainable Development Goals	SDG3. Good health and well-being SDG8. Decent work and economic growth SDG10. Reduced inequalities SDG11. Sustainable cities and communities SDG13. Climate action SDG14. Life below water SDG15. Life on land

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements /format	Supervision and identity verification during assessment
Recognise the typology and the impact of institutional spatial planning for coastal areas	Personal study Case Study Group discussion	Assignment on a case study	Individual work	Unsupervised with no identity verification
Explain how a specific spatial plan for addresses the issues of resilient coastal area in an integrated/ wholistic approach	Personal study Case Study Group discussion	Oral support of the report in the class	Presentation in front of the colleagues	Unsupervised with no identity verification

Bibliography

Books:

1. Hall, P. (1994) Urban & Regional Planning, 5th, edn. London: Routledge.

Publications/articles:

1. Sørdahl, P.B., Kvalvik, I. When all you have is a hammer - integration challenges in coastal zone planning. Maritime Studies 23, 39 (2024).
2. Bonatz, H., Reimann, L. & Vafeidis, A.T. Comparing built-up area datasets to assess urban exposure to coastal hazards in Europe. Sci Data 11, 499 (2024).
3. Santamouris, M., Vasilakopoulou, K. (2024). Urban Climate and Heat Mitigation in Coastal Cities. In: Rassia, S.T. (eds) The Blue Book. Springer, Cham.

	Websites: 1. Coastal Zone Management Plans https://iwrmactionhub.org/learn/iwrm-tools/coastal-zone-management-plans 2. European Commission – Marine Environments https://environment.ec.europa.eu/topics/marine-environment_en 3. European Enviromnental Agency – Marines and Coasts https://www.eea.europa.eu/en/topics/in-depth/seas-and-coasts 4. Department of Environment/ Cyprus – Integrated Coastal Zone Management https://www.moa.gov.cy/moa/environment/environmentnew.nsf/page11_en/page11_en?OpenDocument 5. ESPON - Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe https://archive.espon.eu/planning-systems

Research and Innovation Thinking

(link to the website and registration platform available here)

Professor's name, university & email	Sabine Brüser, University of Rostock, Germany sabine.brueser@uni-rostock.de
Sector	University
Thematic area	Research and Innovation Thinking
EQF level	Level 6 (Bachelor)
ISCED-F field	0413 Entrepreneurship
ESCO skills & competences	S1.0 – skills - communication, collaboration and creativity – communication, collaboration and creativity S2.1 – skills - conducting studies, investigations and examinations T2.4 – transversal skills and competences – thinking skills and competences - thinking creatively and innovatively T4.1 – transversal skills and competences – social and communication skills and competences - communicating
Proposed dates of the classes	Mondays, 13/04, 20/04, 11/05, 18/05, 25/05, 17:00-19:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	Deadline for submitting the exam (EU-CONEXUS Moodle): 01/06, 23:59 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	This micro-credential provides participants with essential skills in the areas of research and innovation, enabling them to manage the complexity of generating new knowledge and translating it into effective solutions. In recent years, rapid technological advances and changing societal needs have increased the demand for innovative approaches in various sectors, including the blue economy. These micro-credentials provide a foundation for understanding research methods, fostering creativity and driving innovation processes, empowering students to become agents of change in a rapidly evolving world.
Description of the content (week by week)	Unit 1. Research and innovation methods (2 hours) Unit 2: Understanding innovation: Fundamentals and principles (2 hours) Unit 3: Critical Thinking and Problem-Solving (2 hours)

	Unit 4: Creativity and Idea Generation (2 hours) Unit 5: Communication of Innovation (2 hours)			
Importance for society	This topic raises awareness and attention to critical issues related to sustainability, innovation and problem solving. By highlighting the interconnectedness of research, innovation and the blue economy, it encourages individuals to think critically about the challenges facing our oceans and to develop creative solutions for a more sustainable future.			
Skills (hard and soft skills)	Hard skills: Research methodologies, Innovation techniques Soft skills: Critical thinking, Communication			
Sustainable Development Goals	SDG8. Decent work and economic growth SDG9. Industry, innovation and infrastructure SDG13. Climate action SDG14. Life below water			
Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements/format**	**Supervision and identity verification during assessment**
Identify different types of innovations (product, process and business model innovations), assess their relevance for the blue economy sector and communicate these findings in a structured and target group-orientated way.	Lectures, Discussion, Group Work, Individual Work, Presentations	Attendance, Evaluation of assignments	Group work, Individual work	unsupervised with no identity verification
Use creative methods such as brainstorming and SCAMPER to develop solutions to complex challenges and present them in a structured and convincing way.				

Bibliography	**Books:**

1. Flick, U. (2017). Introducing Research Methodology: A Beginner's Guide to Doing a Research Project. London: Sage Publications.
2. Elder, L., & Paul, R. (2008). The miniature guide to critical thinking: Concepts and tools. Dillon Beach, CA: Foundation for Critical Thinking.
3. Brown, T. (2009). Change by design: How design thinking transforms organizations and inspires innovation. New York: Harper Business.
4. Pauli, G. (2010). The Blue Economy: 10 years, 100 innovations, 100 million jobs. Paradigm Publications.
5. Froese, R., & Pauly, D. (Hrsg.). (2019). Blue growth: Innovation for a sustainable ocean economy. Cham: Springer.

Neurociencia e Inteligencia Artificial

(enlace a la página web y a la plataforma de inscripción disponible aquí)

Nombre del profesor/a, universidad y correo electrónico	Carmen Moret-Tatay, Universidad Católica de Valencia (España) mariacarmen.moret@ucv.es
Sector	Smart
Área temática	Sistemas cognitivos y neurociencia
Nivel del EQF (Marco Europeo de Cualificaciones)	Nivel 6 (grado)
Campo CINE-F	0313 Psicología
Capacidades y competencias según la clasificación ESCO	K068 – conocimientos – programas y certificaciones interdisciplinarios relacionados con las tecnologías de la información y la comunicación K091 – conocimientos - salud T2.3 – competencias transversales – lidiar con problemas T2.4 – competencias transversales – pensar de manera creative e innovadora S5.6 – competencias – usar herramientas digitales para el trabajo colaborativo, la creación de contenidos y la resolución de problemas
Fechas propuestas de las clases	Viernes, 17/04, 24/04, 8/05, 15/05, 22/05, 15:30-17:30
Una hora para tutorías o consultas	Pendiente de confirmar
Fecha del examen o evaluación final	Viernes, 22/05, 15:30-17:30
Horas síncronas y asíncronas	Horas de contacto síncronas: 10 h Horas asíncronas y aprendizaje autónomo: 15 h
Descripción general	Este curso explora la intersección entre la neurociencia y la inteligencia artificial (IA) analizando cómo los conocimientos sobre el cerebro inspiran avances en conceptos de neurociencia aplicados al ámbito de la salud.
Descripción del contenido	Unidad 1. Una fructífera reciprocidad en la conexión entre la neurociencia y la inteligencia artificial (2 horas) Objetivos principales: 1. Explorar los principios fundamentales de la neurociencia y la inteligencia artificial (IA) con el objetivo de esclarecer los mecanismos subyacentes del

procesamiento de la información tanto en sistemas biológicos como computacionales.
2. Examinar la relación simbiótica entre la neurociencia y la IA, identificando beneficios mutuos y posibles sinergias para avanzar en la comprensión, la innovación y la aplicación en campos como neuro prótesis, interfaces cerebro-ordenador y tecnologías de mejora cognitiva.
3. Fomentar la colaboración interdisciplinar y las habilidades de pensamiento crítico entre los estudiantes, animándoles a integrar conocimientos de neurociencia e IA para abordar retos complejos y consideraciones éticas en el desarrollo e implementación de neuro tecnologías.

Unidad 2. Introducción al Procesamiento del Lenguaje Natural (PLN) (2 horas)

Objetivos principales:

1. Introducir conceptos y técnicas fundamentales del Procesamiento del Lenguaje Natural (PLN), proporcionando a los estudiantes una comprensión completa de cómo los ordenadores pueden comprender y generar lenguaje humano.
2. Explorar diversas aplicaciones del PLN en sectores como la salud, las finanzas, la atención al cliente y el análisis de redes sociales, destacando el impacto transformador del PLN en la recuperación de información, el análisis de sentimientos, la traducción automática y los sistemas de diálogo.
3. Involucrar a los estudiantes en actividades prácticas y proyectos para desarrollar habilidades en el preprocesamiento de texto.

Unidad 3. Identificación de los componentes del lenguaje mediante el PLN (2 horas)

Objetivos principales:

1. Abordar los componentes del lenguaje natural desde la perspectiva del PLN, centrándose en características lingüísticas como sintaxis, semántica, pragmática y estructura discursiva.
2. Adquirir conocimientos básicos para interpretar datos lingüísticos procedentes de diversas fuentes como corpus textuales, plataformas de redes sociales y conversaciones orales, facilitando el uso de recursos en Python y Orange.

Unidad 4. Componentes del PLN para la detección del deterioro cognitivo (2 horas)

Objetivos principales:

1. Investigar la integración de componentes del PLN como análisis de sentimientos, similitud semántica y análisis de coherencia discursiva con protocolos de evaluación cognitiva, permitiendo el desarrollo de herramientas automatizadas para detectar cambios cognitivos sutiles indicativos de enfermedades neurodegenerativas como el Alzheimer y la demencia.
2. Colaborar con profesionales sanitarios e investigadores para validar enfoques basados en PLN en la detección del deterioro cognitivo mediante soluciones de IA.

Importancia para la sociedad	El Procesamiento del Lenguaje Natural (PLN) aplicado a las Ciencias de la Salud es importante para la sociedad debido a su potencial para revolucionar diversos aspectos de la atención sanitaria y la investigación médica. El PLN hace referencia a la tecnología que permite a los ordenadores comprender, interpretar y generar lenguaje humano de manera útil. Cuando se aplica al ámbito de las Ciencias de la Salud, el PLN ofrece varios beneficios cruciales. En conjunto, la capacidad del PLN para mejorar el procesamiento de datos, respaldar la investigación médica y optimizar los resultados de los pacientes lo convierten en una tecnología esencial para el avance de la atención sanitaria, beneficiando en última instancia a la sociedad al promover una mejor salud y bienestar general.
Habilidades duras y blandas	Habilidades duras: IA para la investigación en neurociencia y ética Habilidades blandas: Trabajo en equipo y resolución de problemas
ODS (Objetivos de Desarrollo Sostenible)	SDG3. Salud y bienestar SDG5. Igualdad de género

Resultados de aprendizaje	Métodos de estudio	Métodos de evaluación	Trabajos o tareas: requisitos y formato	Supervisión y verificación de identidad durante la evaluación
Demostrar los fundamentos del Procesamiento del Lenguaje Natural (PLN)	Presentación en clase, práctica en grupo	Asistencia y trabajos individuales	Adquisición de conocimientos básicos sobre PLN	Supervisión en línea o presencial con verificación de identidad
Aplicar conceptos básicos de PLN al lenguaje espontáneo	Estudio de caso individual	Práctica en el que el alumnado debe aplicar un código	Tarea y presentación en clase	Supervisión en línea o presencial con verificación de identidad

Bibliografía

Publicaciones / artículos:

1. Asgari, M., Kaye, J., & Dodge, H. (2017). *Predicting mild cognitive impairment from spontaneous spoken utterances*. *Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3*(2), 219-228.
2. Bird, S., Klein, E., & Loper, E. (2009). *Natural language processing with Python*. O'Reilly Media.
3. Boyd, R. L., & Schwartz, H. A. (2021). *Natural language analysis and the psychology of verbal behavior: The past, present, and future states of the field*. *Journal of Language and Social Psychology, 40*(1), 21-41.
4. Calzà, L., Gagliardi, G., Favretti, R. R., & Tamburini, F. (2021). *Linguistic features and automatic classifiers for identifying mild cognitive impairment and dementia*. *Computer Speech & Language, 65*, 101113.
5. Dehghani, M., & Boyd, R. L. (Eds.). (2022). *Handbook of language analysis in psychology*. Guilford Publications.

	Sitios web: https://www.nltk.org/

IoT Cloud for Digital Twins

(link to the website and registration platform available here)

Professor's name, university & email	Prof. Dr. Jörn Plönnigs, UROS joern.ploennigs@uni-rostock.de
Sector	Urban
Thematic area	Internet of Things
EQF level	Level 6 (Bachelor)
ISCED-F field	E.g. 0521 Environmental sciences
ESCO skills & competences	E.g. K041 – business & administration – operational research S5.1.0 – programming computer systems - create game testing software
Proposed dates of the classes	Tuesdays, 21/04, 28/04, 05/05, 12/05, 19/05, 15:00-17:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	19/05, 15:00-17:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	In the digital twin, all information from the life cycle of buildings, cities, and the environment is brought together and kept up to date in order to improve the sustainability of these systems. The lecture addresses the requirements placed on such a digital life-cycle model and examines the underlying modelling approaches, like IoT-based sensor technology to machine learning and cloud-based optimization. Through practical applications, students learn to apply the established techniques themselves across the entire life cycle.
Description of the content (week by week)	Digital Twins and IoT (1.5h) Sensor and Actuator Technologies (1.5h) Cloud Architectures (1.5h) Practical Architectures (1.5h) Digital Twin Modelling and Analytic (1.5h) Data Processing and Machine Learning (1.5h)

Importance for society	Digital Twins are a core technology to design and operate systems more efficiently. This improves the sustainability of the environmental, smart city and many technical systems.			
Skills (hard and soft skills)	Hard skills: Knowledge for designing IoT and DT Solutions, practical experience in integrating processing IoT data Soft skills: Working in Groups Work, Discussions			
Sustainable Development Goals	SDG6. Clean water and sanitation SDG7. Affordable and clean energy SDG8. Decent work and economic growth SDG9. Industry, innovation and infrastructure SDG11. Sustainable cities and communities			
Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements/format**	**Supervision and identity verification during assessment**
Students will be able to design IoT and DT Solutions.	Lecture, individual work	Online quiz	Individual work	unsupervised with no identity verification
Students will be able to integrate data.	Case studies	Online system integration	Group work	unsupervised with no identity verification
Bibliography	Will be announced during the lecture			

Environmental monitoring and indicators

(link to the website and registration platform available here)

Professor's name, university & email	Sofia Mavrikou, Agricultural University of Athens (Greece) sophie_mav@aua.gr Assistant Professor: Chrysi Papadimitriou, cpapadim@aua.gr
Sector	Coastal
Thematic area	Water management
EQF level	Level 6 (Bachelor)
ISCED-F field	0521 Environmental sciences
ESCO skills & competences	S1.4.2 - presenting research or technical information S2.2.1 - preparing financial documents, records, reports, or budgets T1.3 - working with digital devices and applications
Proposed dates of the classes	Wednesdays, 22/4, 29/4, 06/05, 13/05, 20/05, 10:00-12:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	To be announced
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	Training in the science of environmental monitoring and methods for identifying relevant indicators, including but not limited to the acquisition of environmental data over time to observe or detect changes in key variables. Such monitoring typically focuses on environmental management objectives and, by extension, on assessing potential harmful effects of human impacts, biodiversity and changes in ecological quality over time.
Description of the content (week by week)	Unit 1. The Water Framework Directive (1 hour) Unit 2. Standard classification of rivers (0,5 hour) Unit 3. Criteria for the selection of reference areas and definition of reference conditions (0,5 hour) Unit 4. Introduction to environmental indicators (0,5 hour) Unit 5. Characteristics for the development of indicators (0,5 hour)

	Unit 6. Main types & selection of indicators (0,5 hour) Unit 7. Indicators of the aquatic environment (0,5 hour) Unit 8. Sampling methods and design (1 hour) Unit 9. Data analysis (1 hour) Unit 10. Species-based indicators (0,5 hour) Unit 11. Indicators for river ecological status studies (0,5 hour) Unit 12. Organisms used (0,5 hour) Unit 13. Necessities, periodicity and regulations (0,5 hour) Unit 14. Exam (2 hour)
Importance for society	This micro-credential will have a significant social, economic and environmental impact and will contribute to achieving an appropriate type of environmental monitoring and further analysis to draw statistically sound conclusions. The proposed programme is fully in line with the 17 UN Sustainable Development Goals as it covers areas that include primarily social (environmental awareness, provision of education, remote and multilingual training with practical application) and environmental sustainability (maintaining ecological quality, biodiversity conservation, protection of water resources) and secondarily economic sustainability (training individuals in modern environmental monitoring methods).
Skills (hard and soft skills)	Hard skills: Promoting environmental awareness, Develop skills in environmental tools for assessing ecological quality Soft skills: Critical thinking skills, Problem-solving skills.
Sustainable Development Goals	SDG3. Good health and well-being SDG4. Quality education SDG6. Clean water and sanitation SDG10. Reduced inequalities SDG11. Sustainable cities and communities SDG12. Responsible consumption and production SDG13. Climate action SDG14. Life below water SDG15. Life on land SDG17. Partnerships for the goals

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Use indicators for the assessment of environmental and ecological quality	Lecture, presentations, discussions	Exams	Presentation in front of the colleagues	Supervised online or onsite with identity verification

Design and implement an integrated environmental and ecological quality monitoring system	Lecture, presentations, discussions	Exams	Presentation in front of the colleagues	Supervised online or onsite with identity verification

Bibliography

Book:

Günther, O., Radermacher, F.J., & Riekert, W. (1995). *Environmental monitoring: Models, methods and systems.*

Publications/articles:

1. Anuj, K., Hiesik, K., and Gerhard, P.H. *Environmental Monitoring Systems: A Review*, 2013, IEEE SENSORS JOURNAL,13, 4.
2. Šećerov, I. , Dolinaj, D. , Pavić, D. , Milošević, D. , Savić, S. , Popov, S. and Živanov, Ž. (2019) *Environmental Monitoring Systems: Review and Future Development. Wireless Engineering and Technology*, 10, 1-18. doi: 10.4236/wet.2019.101001.
3. Puig, M., Darbra, R.M., *Innovations and insights in environmental monitoring and assessment in port areas*, 2024, Current Opinion in Environmental Sustainability, 70, 101472, doi:10.1016/j.cosust.2024.101472.

EUCONEXUS

Co-funded by the European Union

Ludic Chinese language learning method with tactile HYPA keyboard

(link to the website and registration platform available here)

Professor's name, university & email	Pierre- Henry de Bruyn, La Rochelle Université (France) phbruyn@univ-lr.fr
Sector	University
Thematic area	Professional communication and academic writing
EQF level	Level 6 (Bachelor)
ISCED-F field	0231 Language acquisition
ESCO skills & competences	L1 – language skills and knowledge – languages – Chinese – interact verbally in Chinese L1 – language skills and knowledge – languages – Chinese – understand written Chinese S1.0.0. – communication, collaboration and creativity – communication, collaboration and creativity - use communication techniques
Proposed dates of the classes	Tuesdays, 28/04, 05/05, 12/05, 19/05, 26/05, 09:00-11:00 (CET)
One hour for tutoring consultations	To be confirmed
Date of the exam/ final assessment	26/05, 09:00-11:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	Experiment the possibility of a same writing for all languages by learning Chinese language in an innovative way with HYPA (Hyper Pinyin Alphabet) tools invented at La Rochelle University. After an introduction to those innovative tools, this micro-credential will concentrate to a first guidance step in practical phonetic exercises in Mandarin Chinese. Those exercises which will be proposed to be done in parallel with encoding specific gestures on those HYPA tools. In conclusion, the translation of those gestures in the languages of the different members attending those micro-credits courses, will help the participants to perceive more concretely the power of the basic paradigm of the Chinese writing system which is a same writing for different languages. The Chinese intuition that a common writing system for many different languages is so much unknown by Westerners that they do not even imagine what could be a Europe sharing a same writing system, as Chinese do. The training would help students to get just a first concrete glimpse of this intuition.

Description of the content (week by week)	Unit 1. Basic Principles to learn to write as Chinese do (2 hours) Unit 2. Phonetic initials in Mandarin Chinese (2 hours) Unit 3. Notion of homophones in Chinese language (2 hours) Unit 4. Phonetic finals (2 hours) Unit 5. Tools to go further (2 hours)
Importance for society	By discovering how Chinese society is based on the principle of a common writing system for many different oral languages, students will be aware of the specificity of the Chinese civilisation's specificity and, by contrast, will get new ideas to contribute to build European unity.
Skills (hard and soft skills)	Hard skills: Oral comprehension, Mastering digital tools Soft skills: Creative thinking, Communication
Sustainable Development Goals	SDG4: Quality education SDG10: Reduced inequalities SDG11: Sustainable Cities and Communities

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Show a basic knowledge of Chinese language	A part of the knowledge acquired by this micro-unit credit will prepare students to international Chinese language exams (HSK).	Ability to write in pinyin some basic Chinese characters with the HYPA tools in specific sentences.	To assess student performance, some of those sentences will be proposed online in a final oral exam of ten minutes by student. He/she will be required to be able: 1) to translate immediately the sentence heard; 2) to recognize in the sentence the character emphasized among others; 3) explain eventually some grammatical element relative to this sentence.	Supervised online or onsite with identity verification
Demonstrate a first level of oral proficiency	Chinese phonetic initiation	Ability to pronounce some basic Chinese phonems Practical registration of repetition of Chinese sentences shared online	Ability to pronounce some basic Chinese phonems Practical registration of repetition of Chinese sentences shared online	Supervised online or onsite with identity verification

Bibliography	**Publications:** 1. Wang, Q., & Andrews, J. F. (2021). *Chinese Pinyin*. American Annals of the Deaf, 166(4), 446-461. 2. Chen, L., & De Bruyn, P. H. (2023). *HYPA, un outil d'innovation en linguistique appliquée. Didactique gestuelle du lexique en Langues-Cultures*. Recherches en didactique des langues et des cultures. Les cahiers de l'Acedle, (21-2). **Links:** 1. http://www.hypacosmos.com/ 2. Hypakeyboard (play store or Apple store) 3. Hypagame (play store by Google search only)

Data Visualization

(link to the website and registration platform available here)

Professor's name, university & email	Jean-Loup Guillaume, La Rochelle Université, France jean-loup.guillaume@univ-lr.fr
Sector	Smart
Thematic area	Digital humanities
EQF level	Level 6 (Bachelor)
ISCED-F field	0611 - Information and Communication Technologies / Computer use
ESCO skills & competences	0223 – philosophy and ethics – data ethics 0612 – database and network design and administration – data visualisation software S1.4.2 - presenting research or technical information - deliver visual presentation of data S2.7.0 – analysing and evaluating information and data
Proposed dates of the classes	Wednesdays, 06/05, 13/05, 20/05, 27/05, 10/06, 10:00-12:00 (CET)
One hour for tutoring consultations	Thursday, 11/06, 11:00-12:00 (CET)
Date of the exam/ final assessment	To be announced - between 15/06 and 19/06 (except 18)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	This course provides a comprehensive introduction to data visualization, combining theoretical foundations with practical demonstrations. Students learn how visual perception, cognitive biases, and design principles influence the way data is interpreted, and how to choose appropriate visual encodings for different types of data and analytical goals. Through real-world examples and live demonstrations, the course covers exploratory analysis, statistical distributions, outlier detection, correlation, and regression. By the end of the course, students are able to critically evaluate, design, and improve data visualizations that are accurate, clear, and ethically sound.
Description of the content (week by week)	Unit 1. Why Data Visualization Matters: Goals, History, and Exploration (2 hours) Unit 2. Seeing Before Understanding: Visual Perception and Attention (2 hours) Unit 3. From Data to Graphics: Visual Encoding and Perceptual Accuracy (2 hours)

	Unit 4. Choosing and Improving Visualizations for Analysis and Communication (2 hours) Unit 5. Ethics and Bias in Data Visualization, Storytelling (2 hours)
Importance for society	Data visualization is essential for society because charts and graphics strongly shape how information is understood, shared, and trusted in the public sphere. In the context of fake news, misleading graphs, distorted scales, or selective data presentation can make false or biased narratives appear credible and objective. Developing strong data visualization literacy helps citizens, journalists, and decision-makers detect manipulation, question visual evidence, and resist the spread of misinformation.
Skills (hard and soft skills)	Hard skills: - Designing and selecting appropriate data visualizations based on data type, analytical goals, and perceptual principles - Analyzing and interpreting visual representations of data, including distributions, outliers, correlations, and regressions Soft skills: - Critical thinking when evaluating data-driven claims, especially in the presence of misleading or biased visualizations - Clear and responsible communication of complex information to diverse audiences
Sustainable Development Goals	SDG4. Quality education: The course strengthens data literacy and critical thinking skills, enabling learners to understand, question, and use data responsibly in academic, professional, and civic contexts. SDG9. Industry, innovation and infrastructure: By teaching effective data visualization and analytical reasoning, the course supports innovation and evidence-based decision-making in science, technology, and industry. SDG10. Reduced inequalities: Clear and ethical data visualization helps reveal social, economic, and health inequalities that are often hidden in complex datasets, supporting more equitable policies. SDG16. Peace, justice and strong institutions: The course promotes transparency, accountability, and resistance to misinformation by equipping students to critically assess data visualizations used in media and public discourse.

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Analyse data visualizations in order to identify patterns, limitations, perceptual issues, and potential sources of	-Lectures on visual perception, visual encoding, and chart selection - Guided analysis of real-world visualizations	- Written analytical assignment - Continuous assessment through in-class visualization	Task: Select published data visualizations (from media, reports, or online sources) and analyze them using concepts from the course (data type, encoding choices, perceptual effectiveness, clarity, and limitations).	Supervised without identity verification

misinterpretation .	from media, science, and business - In-class demonstrations and collective critique sessions - Individual reading of reference materials, practice on several visualization tools.	critique exercises	Goals: - Identify the data and intended message - Evaluate the choice of chart and visual encodings - Discuss at least one perceptual or interpretative issue - Propose a corrected version	
Evaluate and design data visualizations that communicate analytical results accurately, clearly, and responsibly for a defined audience.	- Lectures on design principles, ethics, bias, and storytelling with data - Live demonstrations of visualization creation and improvement - Practical sessions focused on distributions, outliers, correlation, and regression - Peer discussion and feedback on visualization choices	- Practical project combining visualization design and justification - Written presentation of design choices	Task: Create a set of visualizations from a provided dataset to communicate a specific analytical message to a defined audience. Goals: - Design several visualizations addressing different aspects of the data - Accompanying short justification explaining design choices, audience considerations, and ethical implications - Explicit discussion of potential misinterpretations or bias Individual or small group work (2–3 students maximum)	Supervised without identity verification
Bibliography	**Books:** 1. Andy Kirk - Data Visualisation, A hanbookfor Data Driven Design 2. Alan Smith - How Charts Work 3. Edward Tufte - The visual Display of Quantitative Information 4. NathauYau - Visualize This, The FlowingDataGuide to Design, Visualization, and Statistics 5. A brief history of Data Visualization: https://datavis.ca/papers/hbook.pdf **Publications/articles:**			

1. Cleveland and Mc Gill, J.of the American Statistical Association, 79, 387
2. Heer and Bostock. CHI2010, p. 203–212
3. Treisman and Gelade, Cognitive Psychology, 1980, 12-1, pp 97-136

Websites:

1. Junk Charts: https://www.junkcharts.com/
2. Flowing Data: https://flowingdata.com/
3. JuyceAnalytics blog: https://www.juiceanalytics.com/insights
4. DatavizUniverse Blog: https://prodigious-trailblazer-3628.kit.com/profile/posts
5. Datavizpitfalls: https://www.data-to-viz.com/caveats.html
6. One chart at a time: https://www.youtube.com/playlist?list=PLfv89tPxlTiVIrwuSBCISiBaGSH1CJR5-

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Co-funded by the European Union

Using AI when working with very large document collections: opportunities and risks

(link to the website and registration platform available here)

Professor's name, university & email	Nicolas Sidere, La Rochelle Université (France) nicolas.sidere@univ-lr.fr
Sector	Smart
Thematic area	Digital humanities
EQF level	Level 6 (Bachelor)
ISCED-F field	0688 Inter-disciplinary programmes and qualifications involving Information and Communication Technologies (ICTs)
ESCO skills & competences	K0619 – knowledge – information and communication technologies (icts) – information and communication technologies (icts) – information and communication technologies not elsewhere classified – principles of artificial intelligence S2.7 – analysing and evaluating information and data T2.1 – transversal skills and competences – thinking skills and competences – processing information, ideas and concepts – think analytically T2.4 – transversal skills and competences – thinking skills and competences – thinking creatively and innovatively – think innovatively
Proposed dates of the classes	Wednesday 06/05, 13/05, 20/05, 27/05, 03/06, 13:30-15:30 (CET)
Two hours for tutoring consultations	To be announced
Date of the exam/ final assessment	03/06, 13:30-15:30 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 2 Asynchronous hours & self-directed learning: 23 h Online office hours will be provided

General description	Artificial Intelligence (AI) is a key development of the digital transformation that considerably affects all of our lives. In this course, we will see how AI can be used to apprehend large collections of documents (among other opportunities) and what risks this actually poses, in particular in the context of digital humanities. Key skills to be learnt in the course are the following: 1. **Know what you are dealing with and know what you are doing with it**: working on being aware of the limits of automated approaches (e.g. since optical character recognition is imperfect, a search engine keyword query will not necessarily provide all the matching documents, thus causing the risk that a large portion of the relevant information is completely missed, causing false interpretations based on incomplete data). It is essential for DH students to get a good understanding of how the algorithms for document analysis function, in order to get an informed understanding of their capacities and limits. 2. **Use of digital libraries (DL):** The NewsEye platform as an example of a self-contained digital library including a tool box and meaning to export collections and subcollections. As all DLs share common properties, learning to use one is very helpful to using others in the future 3. **Develop critical thinking when using tools and datasets and understand hermeneutics.** 4. **Learn to be involved in collaborative interdisciplinary work:** concentration on work with small interdisciplinary tasks in groups, engaging students of different backgrounds to combine their skills, work with each other and learn from each other. Learning to collaborate with specialists of other disciplines is a critical aspect of any work in digital humanities, as no one can ever become a specialist of all the disciplines involved.
Description of the content (week by week)	Unit 1. Introduction (5 hours, including homework) Unit 2. Presentation of the NewsEye platform (5 hours, including homework) Unit 3. Understanding how such a platform works (5 hours, including homework) Unit 4. Information extraction and document understanding (5 hours, including homework) Unit 5. Final project work (5 hours, including homework)

Importance for society	Make people more aware of what using AI implies, what it can do, what it cannot, and what happens behind the curtain.			
Skills (hard and soft skills)	Hard skills: Understanding NewsEye project & Using digital libraries Soft skills: Critical thinking & Cross-cultural collaboration			
Sustainable Development Goals	SDG4: Quality education SDG9: Industry, innovation and infrastructure			
Learning outcomes	**Study methods**	**Assessment methods**	**Assignments. Requirements /format**	**Supervision and identity verification during assessment**
Demonstrate a critical thinking in using tools and datasets and understanding hermeneutics	Online material and lectures, independent work	Quizz	Quizz	Unsupervised with no identity verification
Show knowledge of the concept of digital humanities	Online material and lectures, independent work	Quizz and project	Quizz and project	Unsupervised with no identity verification
Bibliography	– Material: ○ https://teach.dariah.eu/course/view.php?id=71 – Background ○ https://www.newseye.eu/ ○ A Doucet et al., (2020) *NewsEye: A digital investigator for historical newspapers*, Digital Humanities ADHO (link) ○ C. Suire et al., (2023) *An OER on digital historical research on European historical newspapers with the NewsEye platform,* Journal of Education for Information, vol. 39, no. 2, pp. 139-153 (link) ○ *S*. Oberbichler et al., (2022) *Integrated interdisciplinary workflows for research on historical newspapers: Perspectives from humanities scholars, computer scientists, and librarians,* Journal of the Association for Information Science and Technology 73(2): 225-239 (link)			

EUCONEXUS

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Animal welfare in research labs

(link to the website and registration platform available here)

Professor's name, university & email	Emmanouil Malandrakis, Agricultural University of Athens (Greece) emalandrak@aua.gr
Sector	University
Thematic area	Ethics/Bioethics
EQF level	Level 6 (Bachelor)
ISCED-F field	0899 Agriculture, forestry, fisheries and veterinary not elsewhere classified
ESCO skills & competences	K0920 – knowledge – health and welfare – welfare - welfare not further defined K0831 – knowledge – agriculture, forestry, fisheries and veterinary – fisheries - fisheries S6.9.0 – skills – handling and moving - handling animals – handling animals
Proposed dates of the classes	Wednesdays, 06/05, 13/05, 20/05, 27/05, 03/06, 15:00-17:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	To be announced
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	After the successful completion of the Program, the students will be able to demonstrate responsibility for implementing, monitoring, and maintaining the right conditions for Experimental Animals.
Description of the content (week by week)	Unit 1. Introduction - Stress and Welfare in Experimental Animals (2 hours) Unit 2. National and international legislation regarding the handling of laboratory animals (2 hours) Unit 3. Fundamental knowledge of laboratory animal care (2 hours) Unit 4. Statistical analysis and data processing of animal experimental data (2 hours) Unit 5. Written exams (2 hours)
Importance for society	This micro-credential is expected to yield substantial social, economic, and environmental benefits, promoting sustainable production practices and ensuring the welfare of the animals involved.

Skills (hard and soft skills)	**Hard skills:** • Fish care in laboratory conditions, • Legislation about animal experimentation (European and national) • Statistical analysis for fish experimentation (power analysis, Analysis of variance etc.). **Soft skills:** • Oral and written communication skills, • Critical thinking skills, • Problem-solving skills.
Sustainable Development Goals	SDG4. Quality education SDG9. Industry, innovation and infrastructure SDG14. Life below water

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Analyze fundamental concepts of fish stress physiology	Lecture, presentations, discussions	Written exams	Students will be required to discuss their ideas with colleagues.	Supervised online with identity verification.
Plan fish handling and experimentation in the lab	Lecture, presentations, discussions	Written exams	Students will be required to discuss their ideas with colleagues.	Supervised online with identity verification.

Bibliography

Books:

1. *The Welfare of Fish*, 2020. Kristiansen S. Tore, Fernö Anders, Pavlidis A. Michalis, Hans van de Vis. Springer

Publications/articles:

1. M. Toni, A. Manciocco, E. Angiulli, E. Alleva, C. Cioni, S. Malavasi, (2019) *Review: Assessing fish welfare in research and aquaculture, with a focus on European directives*, Animal,13 (1):161-170
2. Paul J. Ashley (2007) *Fish welfare: Current issues in aquaculture, Applied Animal Behaviour Science*, 104, (3–4): 199-235

Websites:

1. https://www.efsa.europa.eu/en/topics/topic/fish-welfare
2. https://fishfromgreece.com/en/nea/approval-of-the-mediterranean-fish-welfare-as-national-guide/
3. https://www.fao.org/family-farming/detail/en/c/1068913/

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Social Entrepreneurship and Commitment in SmUCS

(link to the website and registration platform available here)

Professor's name, university & email	Johann-Christian Põder, johann-christian.poder@uni-rostock.de Ulrike Schröder, ulrike.schroeder2@uni-rostock.de Stefan Dienstbeck, stefan.dienstbeck@uni-rostock.de University of Rostock (Germany)
Sector	Sustainability
Thematic area	Social Entrepreneurship and Commitment
EQF level	Level 6 (Bachelor)
ISCED-F field	0223 Philosophy and ethics
ESCO skills & competences	K.0223 – knowledge – arts and humanities – philosophy and ethics T.6.2 – transversal skills and competencies – applying environmental skills and competences T.6.4 – transversal skills and competencies – applying cultural skills and competencies T.4.3 – transversal skills and competencies – collaborating in teams and networks – demonstrate intercultural competence
Proposed dates of the classes	Fridays, 08/05, 15/05, 22/05, 29/05, 05/06, 10:00-12:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	05/06, 10:00-12:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 12 h Asynchronous hours & self-directed learning: 13 h
General description	This course examines the rapidly evolving field of social entrepreneurship and the ethics of sustainability and explores how to create social impact by integrating ethical principles and sustainable practices into entrepreneurial strategies. With a focus on sustainability, this course equips students with the tools to promote environmental stewardship and social justice, from religious as well from secular perspectives. With an emphasis on developing interfaith and intercultural skills, this course prepares students to engage respectfully and effectively with diverse communities. Through case studies and critical discussion, students will explore innovative social entrepreneurship and ethical strategies that promote a culture of sustainability, inclusivity and global awareness.

Description of the content (week by week)	Unit 1. What is social entrepreneurship? Ethical and social commitments (2 hours) Unit 2. Ethics of sustainability in social entrepreneurship (2 hours) Unit 3. The humanistic foundations of sustainability (2 hours) Unit 4. World religions and sustainability (2 hours) Unit 5. Sustainable action and leadership: Case Studies (2 hours)
Importance for society	The social importance of this micro-credential for society lies in exploring the vital link between social entrepreneurship and the ethics and practice of sustainability, highlighting the essential role of social and religious entrepreneurship in addressing global challenges, and equipping students with skills to create meaningful social impact.
Skills (hard and soft skills)	Hard skills: Communication skills, Research skills Soft skills: Analytical & critical thinking, Ethical and religious awareness
Sustainable Development Goals	SDG4. Quality education SDG9. Industry, innovation and infrastructure SDG11. Sustainable cities and communities SDG12. Responsible consumption and production SDG13. Climate action SDG16. Peace, justice and strong institutions SDG17. Partnerships for the goals

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements /format	Supervision and identity verification during assessment
Explain & critically evaluate ethical theories and religious frameworks of social entrepreneurship and sustainability thinking in global perspective	presentations lectures group work individual work homework (tasks)	attendance and class participation quizz	student presentation	supervised online or onsite with identity verification
Collaborate or lead in ethically responsible and religiously aware decision making in culturally diverse settings	presentations lectures group work individual work homework (tasks)	attendance and class participation quizz	written assignment	supervised online or onsite with identity verification

Bibliography	

Books:

1. Nicholls, A. (2006). *Social Entrepreneurs – New Models of Sustainable Social Change*, Oxford University Press.
2. Langergaard, L. L., Dupret, K., & Eschweiler, J. (Eds.) (2023). *Learning about Social Entrepreneurship and Management in Times of Social Transformation*. Springer.
3. Bornstein, D. (2007). *How to Change the World*, Oxford University Press.
4. Defourny, J. & M. Nyssens (2021). *Social Enterprise in Western Europe – Theory, Models and Practice.* Routledge.
5. Becker, C. U. (2023). Sustainability Ethics and Sustainability Research, Springer.
6. Singh, N.,, et al. (Eds.) (2023). *Faith Traditions and Sustainability: New Views and Practices for Environmental Protection*. Springer International.
7. John, Mulford, et al. (Eds.) (2024). *Faith-Based Entrepreneurship: An Empirical Analysis of Christian Faith-Based Firms*. Springer.
8. Pittinsky, T. L. (2009). *Crossing the Divide: Intergroup Leadership in a World of Difference*.Harvard Business Press.
9. Collste, G. (Ed.) (2016). *Ethics and Communication: Global Perspectives*. London: Rowman & Littlefield.
10. Schweiker, W. (Ed.) (2008). *The Blackwell Companion to Religious Ethics*. Blackwell

Articles:

1. De Paula, G. O., and Cavalcanti, R. N. (2000), “Ethics: Essence for Sustainability”, *Journal of Cleaner Production* 8.2: 109-117.
2. Rendtorff, J. D. (2020). Sustainability, Basic Ethical Principles, and Innovation. *Handbook of Business Legitimacy: Responsibility, Ethics and Society*. Ed. by R. J. Dahl. Cham: Springer. pp. 1631-1658.
3. Robinson, J. (2004). “Squaring the Circle? Some Thoughts on the Idea of Sustainable Development” *Ecological Economics* 48: 369-384.
4. Chunoo, V. S., and K. Callahan (2017). "Pedagogy in Action: Teaching Culturally Relevant Leadership." *Journal of Leadership Studies* 11.3: 42-47.
5. Redekop, Benjamin (2010). "Challenges and Strategies of Leading for Sustainability." *Leadership for Environmental Sustainability*. Ed. by B. W. Redekop and S. Olson. London: Routledge. pp. 55-66.

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2. https://trellis.net
3. https://plos.org/
4. https://religiousfreedomandbusiness.org/about-our-work

UAS principles, data modelling and analysis

(link to the website and registration platform available here)

Professor's name, university & email	Ana-Cornelia Badea, Dragos Badea, Technical University of Civil Engineering Bucharest (Romania) ana.badea@utcb.ro; dragos.badea@utcb.ro
Sector	Smart
Thematic area	Sustainable IT
EQF level	Level 6 (Bachelor)
ISCED-F field	0521 Environmental sciences
ESCO skills & competences	T1.3 - transversal skills and competences – core skills and competences - working with digital devices and applications T2.2 – transversal skills and competences – thinking skills and competences - planning and organising T4.3 – transversal skills and competences – social and communication skills and competences - collaborating in teams and networks S5.5 – skills – working with computers - accessing and analysing digital data S1.4.2 - skills – communication, collaboration and creativity – presenting information – presenting research or technical information
Proposed dates of the classes	Thursdays and Fridays, 14/05, 15/05, 21/05, 22/05 and Monday 25/05, 15:00-17:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	Monday 25/05, 15:00-17:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h

General description	• Concepts of UAVs, Flight Planning, Aerial imaging, LiDAR
	  ○ Classification of drones
	  ○ Photogrammetric data acquisition
	  ○ Theoretical and practical elements before flying the UAS
	• Geospatial Data Processing using Dedicated Software
	  ○ Different types of software for modeling
	  ○ Different types of problems analyzed based on UAS images
	  ○ Possibilities of 3D modeling based on UAS images

Description of the content (week by week)	Unit 1. Classification of drones (2 hours) Unit 2. Photogrammetric data acquisition (2 hours) Unit 3. Theoretical and practical elements before flying the UAS (1 hour) Unit 4. Different types of software for modelling (1 hour) Unit 5. Different types of problems analysed based on UAS images (2 hours) Unit 6. Possibilities of 3D modelling based on UAS images (2 hours)
Importance for society	UAS Principles, Data Modeling and Analysis has been used in various fields such as medicine, engineering, mapping, architecture, manufacturing, police investigation, cultural heritage, and geology. One of the most common uses of photogrammetry is creating maps out of aerial photos. It has proven to be accurate and cost-effective and accurate, allowing planning entities like architects, local governments and construction workers to make clear, informed decisions about their projects without spending months scouring the landscape
Skills (hard and soft skills)	Hard skills: Technology use, Technological literacy Soft skills: Analytical thinking, Curiosity
Sustainable Development Goals	SDG4: Quality education SDG9: Industry, Innovation and Infrastructure SDG11: Sustainable cities and communities SDG15: Life on land

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Demonstrate knowledge on flying procedures, data expectancy, UAS pre-flight requirements, identifying steps about UAS data acquisition	1-Lectures 2-Case studies & discussions (Laboratory) 3-Tutorials	1-Time-constrained online quizzes 2-Discussions 3-Evaluation of practical skills	group work	Supervised online with identity verification
Analysing and modelling data by specific tools	1-Lectures 2-Case studies & discussions (Laboratory) 3-Tutorials	1-Time-constrained online quizzes 2-Team presentation 3-Discussions	group work	Supervised online with identity verification

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Books:

1. McGlone, C. (2013). *Manual of Photogrammetry - Sixth Edition* ISBN 10: 1570830991 ISBN 13: 9781570830990, ASPRS
2. Wright, D., Harder, C. (2020). *GIS for Science: Applying Mapping and Spatial Analytics,* Volume 2, ISBN: 9781589485877, ESRI Press

Publications/Articles:

1. A. A. Arfakhsyad, A. N. Rahman, L. Kinanti, A. A. Awwalur Rizqi and H. N. Muhammad, "Unmanned Aerial Vehicle (UAV) Data-Driven Modeling Software with Integrated 9-Axis IMU-GPS Sensor Fusion and Data Filtering Algorithm," 2023 15th International Conference on Information Technology and Electrical Engineering (ICITEE), Chiang Mai, Thailand, 2023, pp. 167-173, doi: 10.1109/ICITEE59582.2023.10317781
2. Badea, A. C., Badea, G. - An Overview of Geoprocessing and Export Options for Creating 3D GIS Models Using Drone2Map, RevCAD 28/2020, pg. 7-14, http://revcad.uab.ro/upload/49_761_badeaa_badea.pdf
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Websites:

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2. https://www.asprs.org/
3. https://www.esri.com/en-us/home

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Marine ecosystem services and the impact of the Invasive Alien Species in the Mediterranean Sea

(link to the website and registration platform available here)

Professor's name, university & email	Stefanos Kalogirou, Agricultural University of Athens (Greece) stefanos.kalogirou@aua.gr
Sector	Coastal
Thematic area	Ecosystem services
EQF level	Level 6 (Bachelor)
ISCED-F field	0521 Environmental sciences
ESCO skills & competences	K0521 - knowledge – natural sciences, mathematics and statistics – environment - environmental sciences K0522 - knowledge – natural sciences, mathematics and statistics – environment - natural environments and wildlife T6.2 – transversal skills and competences – life skills and competences - applying environmental skills and competencies
Proposed dates of the classes	Fridays, 15/05, 22/05, 29/05, 05/06, 12/06, 09:00-11:00 (CET)
One hour for tutoring consultations	To be announced
Date of the exam/ final assessment	To be announced
Synchronous & asynchronous hours	Synchronous contact hours: 10 h Asynchronous hours & self-directed learning: 15 h
General description	This micro-credential offers an in-depth exploration of marine ecosystem services and the impacts of invasive species, emphasizing their ecological importance. The topic has evolved with a growing understanding of ecological interactions and the critical services marine ecosystems provide, driven by climate change, biodiversity loss, and public awareness. Understanding these concepts equips students with the skills to contribute to sustainable management practices and policies, opening diverse career opportunities. The course fosters critical thinking and problem-solving abilities, preparing students to engage with global conservation efforts.
Description of the content (week by week)	Unit 1. Introduction to marine ecosystems and their functioning - ecosystem services (2 hours)

	Unit 2. Marine ecosystem services and their functioning - Ecology to study Invasive Alien Species (2 hours) Unit 3. In-depth study of invasive alien species and their impact on marine ecosystem services in the Mediterranean Sea. Case studies of invasive species (2 hours) Unit 4. Case studies of invasive species (2 hours) Unit 5. Exam session (2 hours)
Importance for society	The significance for society lies in understanding the essential services marine ecosystems provide that invasive species can disrupt, leading to significant ecological and socioeconomic changes. This topic highlights the need for proactive conservation efforts, informed policy-making, and community engagement to protect marine environments. Increased attention to these issues fosters a sense of responsibility and encourages actions toward sustainability and resilience.
Skills (hard and soft skills)	Hard skills: • Knowledge of basic concepts related to marine ecosystems and ecosystem services • Knowledge of basic concepts related to marine invasive species • Identification of key invasive species • Impacts of key invasive species Soft skills: • Critical thinking: Students will enhance their ability to approach problems from multiple perspectives and make informed decisions. • Collaboration: Students will improve their skills in working effectively with others, including interdisciplinary teams and stakeholders.
Sustainable Development Goals	SDG13. Climate action SDG14. Life below water SDG17. Partnerships for the goals

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements /format	Supervision and identity verification during assessment
Explain the processes and the ecosystem services of Mediterranean marine ecosystems.	Presentations, Group work, Exams	Presentation (50%) Written Exams (50%)	Students will be required to discuss their ideas with colleagues	Supervised online with identity verification
Outline the concepts related to Invasive Alien Species (IAS)	Presentations, Group work, Exams	Presentation (50%) Written Exams (50%)	Students will be required to discuss their ideas with colleagues	Supervised online with identity verification

and recognize the most common ones; Discuss the impact of the alien invasive species on native endemic organisms, the ecosystem, and ecosystem services.				

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Fifty Years of Invasion Ecology: The Legacy of Charles Elton, 2010. David M. Richardson, Blackwell Publishing Ltd

Publications/articles:

1. Katsanevakis S., Wallentinus I., Zenetos A., Leppäkoski E., Çinar M. E., Oztürk B., Grabowski M., Golani D. and Cardoso A. C. (2014). *Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European.* Review: Aquatic Invasions Volume 9, Issue 4: 391–423
2. Liquete, C., Piroddi, C., Macías, D. et al. (2016). *Ecosystem services sustainability in the Mediterranean Sea: assessment of status and trends using multiple modelling approaches*. Sci Rep 6, 34162 (2016).
3. Basconi, L., Rova, S., Stocco, A., & Pranovi, F. (2023). Ecosystem services for supporting coastal and marine resources management, an example from the Adriatic sea (Central Mediterranean sea). *Ocean & Coastal Management*, *235*, 106486.

Websites:

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Cybersecurity for Smart Ports & Maritime Industries

(link to the website and registration platform available here)

Professor's name, university & email	Giovanni Di Noto, Klaipeda University (Lithuania) giovanni.di-noto@ku.lt
Sector	Coastal
Thematic area	Smart Ports
EQF level	Level 6 (Bachelor)
ISCED-F field	0688 - Inter-disciplinary programs and qualifications involving information and Communication Technologies
ESCO skills & competences	T4.5 – transversal skills and competences – social and communication skills and competences - following ethical code of conduct S5.2.2 - skills – working with computers – setting up and protecting computer systems – protecting ICT devices – implement ICT security policies K1031 - knowledge – services – security services – military and defence – cyber security
-Proposed dates of the classes	Thursdays, 21.05, 28.05. 4.06, 11.06, 18.06, 16:00 to 18:00 (CET)
One hour for tutoring consultation	To be announced
Date of the exam/ final assessment	Thursday, 18.06, 16:00 to 18:00 (CET)
Synchronous & asynchronous hours	Synchronous contact hours: 11 h Asynchronous hours & self-directed learning: 14 h
General description	This course builds the skills and knowledge required to enhance ports' smartness with tools and methods tailored to the unique cybersecurity challenges impacting ports and maritime industries. It explores cybersecurity themes across all informational layers from their outer dimensions (CTI ecosystems, cloud infrastructure, public networks, on-ship & cargo security, port connected operational systems & IoT fleet) to inner ones (authentication, identity management, application, data, AI/ML security, future challenges with quantum computing) considering both threat & prevention/mitigation strategies and how to implement them.
Description of the content (week by week)	**Lecture 1: Introduction to cybersecurity discipline (2 hours)** • Class introductions, MC introduction, goals, structure, exam structure

- Ethical vs non-ethical hacking, red vs blue, black/white box methods
- Cybersecurity landscape, historical background & post-2021 context
- GRC (Governance, Risk & Compliance), Learning organizations
- ISO-31000, ISO-27001 & tooling overview

Self-Learning (1.5 hours): research & read about cybersecurity use cases in port & maritime industries, root causes, impact, mitigation, prevention, GRC frameworks such as ISO-27001, ISO-31000, cybersecurity legislation including port specific.

Lecture 2: Cybersecurity outer, network & endpoint layers (2 hours)

- CTI networks, protocols, ecosystems (STIX/TAXII, CVE, OWASP, NIST), cloud infrastructure LEO satellite networks, mono vs multi-vendor supply chain, CDN (Content Delivery Networks), technical & legal cyber-hunting
- Physical security, DDoS, network gateways, firewalls, DNS, metal/virtual server, SOE, encryption, certificates, DRM, drills, endpoint IoT, stolen assets
- Port & maritime assets exposure, jamming devices, trojan cargoes, other network layer mitigative strategies

Self-Learning (1.5 hours) research & use outer layers cybersecurity tools, study attack techniques over networks, servers & endpoints, and how to prevent them.

Lecture 3: Cybersecurity authentication & architectural layers (2 hours)

- Identity management, MFA users & IoT, Network level privileges & permissions, information security policies, segregation of duties, 0-Trust, audit logs, reconnaissance techniques, sniffing, social engineering, threat avoidance tools
- Software quality assurance, SBOM, findings evaluation, ranking & prioritization
- Security & Privacy By-Design software architecture & development principles

Self-Learning (1.5 hours) research & read about SOX principles, automated testing tools, secure-by-design software architecture

Lecture 4: Cybersecurity inner app & data layers (2 hours)

- Common app threat types, classification, ranking, app configuration risks, app threats & related mitigation/prevention (code reviews, 3P libraries audits, featuritis neutralization, vulnerability & penetration testing)
- Data classification, SQL injection types, AI/ML threats & other data-related attacks, data leakages & their mitigation/prevention such as with DLT
- Challenges with AI/ML, DLT, IoT/E, & Quantum Computing (data encryption)

Self-Learning (5.5 hours) practical cyber war games (red & blue teams)

Lecture 5: Cybersecurity change management & implementation (2 hours)

- Change management & cybersecurity implementation strategies, green fields/environments vs established organization
- Cybersecurity inspections/assessments, forensics/reports
- Cybersecurity radar, cybersecurity awareness and training

Self-Learning & exam preparation (5 hours) general revision & preparation for knowledge assessment exam, individual project preparation & submission.

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Importance for society	This course educates and prepares students to become professionals that will advance cybersecure digitalization for sustainable smart ports and maritime industries. The maritime industry is responsible for the transportation of over 90% of global trade. It faces an increasing risk surface and has become a de facto target for cyber criminals.
Skills (hard and soft skills)	**Hard skills:** • Advanced cybersecurity ethical hacking, threat identification & classification • Preventative & mitigative techniques, incident response **Soft skills:** • Ethics, Good Governance & Risk Management • Planning, Critical Thinking, Communication & Change Management
Sustainable Development Goals	SDG9. Industry, innovation and infrastructure SDG11. Sustainable cities and communities

Learning outcomes	Study methods	Assessment methods	Assignments. Requirements/format	Supervision and identity verification during assessment
Setup cyber security strategies for port & maritime operations.	Lectures, Group discussions, Individual research, Individual project work.	Online quiz Individual project	Submission for individual projects in the form of a recorded video in Pecha-Kucha format (20 slides, 20 seconds per slide) on a relevant topic, such as real-world port-related cyber-attack case analysis, or cybersecurity solution. Presentations scored on 1) Use case or proposed solution's cybersecurity strengths, 2) Visual communication skills, 3) overall clarity & articulation	electronically unsupervised online (Moodle), time-limited with login-based identity verification. Individual project: unsupervised, with identity verification (live recorded presentation)
Manage cyber threats & incidents.	Lectures, Individual research.	Online Quiz	30-questions time-limited online Quiz	electronically unsupervised online (Moodle), time-limited with login-based identity verification.

Bibliography	**Books:** 1. Rashid, Chivers, Danezis, Lupu, Martin,2019, "*Cyber Security Body of Knowledge*" 2. Mark E. Goldstein, 2019 "*Port Cybersecurity: Securing Critical Infrastructure*" 3. Todd E, Williamson P, 2020, "*Cybersecurity in the Maritime Domain*"