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EUROPEAN UNIVERSITY FOR CUSTOMISED EDUCATION

STUDY GUIDE

INNOVATING SOLUTIONS: MICRO-NANO TECHNOLOGIES AND SENSORS FOR GLOBAL CHALLENGES

Organised by

University of Catania (UNICT)
University of Cantabria (UC)

1. IDENTIFYING DATA.	
· Course Name.	Innovating Solutions: Micro-Nano Technologies and Sensors for Global Challenges
· Coordinating University.	University of Catania (UNICT) University of Cantabria (UC)
· Partner Universities Involved.	University of Catania (UNICT) University of Cantabria (UC) Poznan University of Technology (PUT) University of Mons (UMONS) Université Polytechnique Hauts-de-France (UPHF) University of Peloponnese (UoP)
· Course Field(s).	Micro-Nano Technologies. Sensors.
· Related Study Programme.	Students having a technological scientific background and a particular interest in Sustainable Agriculture, Cultural Heritage, Environmental Protection, Healthcare and Smart Energy Mobility.
· ISCED Code.	0714: Electronics and automation
· SDG.	- SDG 3: Good Health and Well-Being - SDG 6: Clean Water and Sanitation - SDG 7: Affordable and Clean Energy - SDG 9: Industry, Innovation and Infrastructure - SDG 11: Sustainable Cities and Communities - SDG 13: Climate Action
· Study Level.	Ph.D., Master, plus last year Bachelor doing their final thesis on the topic of the Summer School
· EUNICE Key Competencies	Problem solving: MODERATELY Teamworking: MODERATELY Communication: MODERATELY Self-management: MODERATELY Cognitive flexibility: MODERATELY Digital competence: MODERATELY Technical competence: MODERATELY Global intercultural competence: MODERATELY

· Number of ECTS credits allocated.	3 ECTS (sum of the virtual and on-site components)
· Mode of Delivery.	Erasmus+ Blended Intensive Programme (BIP), i.e. a virtual component + physical mobility
· Language of Instruction.	English

· Course Dates.	Virtual component: June 1 – June 19, 2026 On-site component: June 22 – June 26, 2026
· Precise Schedule of the Lectures.	Virtual component: June 1 – June 19, 2026 On-site component: Monday 22-06-2026 - Session 1: 09:30-11:30: Module 1. Sustainable Agriculture (Anna Maria Gueli – UNICT) - Session 2: 12:00-14:00: Module 1. Sustainable Agriculture (Clara Casado – UC) Tuesday 23-06-2026 - Session 3: 09:30-11:30: Module 2. Culture Heritage Preservation (Giuseppe Politi – UNICT) - Session 4: 12:00-14:00: Module 2. Culture Heritage (Diego Garate Maidagan – UC) Wednesday 24-06-2026 - Session 5: 09:30-11:30: Module 3. Environmental Protection (Denise Michez – UMONS) - Session 6: 12:00-14:00: Module 3. Environmental Protection (Angelika Charkiweicz – PUT) Thursday 25-06-2026 - Session 7: 09:30-11:30: Module 4. Healthcare (Robert Bucki – PUT) - Session 8: 12:00-14:00: Module 4. Healthcare (Ewelina Piktel – PUT) Friday 26-06-2026 - Session 9: 09:30-11:30: Module 5. Smart Energy Mobility (Mohamed Rguiti – UPHF) - Session 10: 12:00-14:00: Module 5. Smart Energy Mobility (Tanya Politi – UoP)
· Key Words.	Micro-Nano Technologies, Sensors, Sustainable Agriculture, Cultural Heritage, Environmental Protection, Healthcare, Smart Energy Mobility
· Catchy Phrase.	“An inspiring experience where micro-nano technologies and sensors meet real-world global challenges”.

· Prerequisites and co-requisites.	- EUNICE Students having a technological scientific background and a particular interest in Sustainable Agriculture, Cultural Heritage, Environmental Protection, Healthcare and Smart Energy Mobility. - Ph.D., Master, plus last year Bachelor doing their final thesis on the topic of the Summer School - English B2
· Number of EUNICE students that can attend the Course.	50
· Course inscription procedure(s).	- UC students: enrol through Virtual Campus - Students from EUNICE universities: contact your International Relations Office (IRO)

2. CONTACT DETAILS.	
· Department.	Department of Electric, Electronic and Computer Science Engineering AND Department of Economics and Business (UNICT) Department of Applied Physics AND Department of Electronics Technology, Systems and Automation Engineering (UC)
· Name of Lecturer.	Olga M. Conde (UC) Salvatore Corrente (UNICT) Yael Gutiérrez (UC) Carlo Trigona (UNICT)
· E-mail.	olga.conde@unican.es; salvatore.corrente@unict.it; yael.gutierrezvela@unican.es; carlo.trigona@unict.it
· Other Lecturers.	Prof. Anna María Gueli (UNICT) Prof. Denis Michez(UMONS) Prof. Robert Bucki(PUT) Prof. Mohamed Rguiti(UPHF) Prof. Diego Gárate Maidagan (UC) Prof. Giuseppe Politi(UNICT) Prof. Angelika Charkiewicz (PUT) Prof. EwelinaPiktel(PUT) Prof. Tanya Polity(UoP) Prof. Clara Casado (UC)
Course Secretary.	Gema Pérez (eunice@unican.es)

3. COURSE CONTENT.

The proposed summer school is designed to offer an intensive and interdisciplinary educational experience focused on the development, integration, and application of advanced micro- and nano-technologies, with particular emphasis on sensors and smart systems. The programme is structured around five key research domains (pillars): sustainable agriculture, cultural heritage preservation, environmental protection, healthcare, and smart energy mobility, areas in which these enabling technologies are playing an increasingly transformative role.

The summer school will provide participants with a comprehensive understanding of how sensors, electronics, data analytics, and system integration work together to solve complex challenges. The programme bridges foundational science with practical, domain-specific applications across the five focus areas.

4. LEARNING OUTCOMES.

The learning aspect of the school aims to equip the next generation of researchers and innovators with the skills to develop micro- and nano systems (MEMS/NEMS) that are technologically advanced, intelligent, adaptive, and sustainable.

Students will learn also how to create solutions with tangible societal impact across a range of application domains.

Particular emphasis will be given on sensors, devices and solutions spanning from precision agriculture and environmental monitoring to cultural heritage conservation, healthcare and smart energy mobility.

5. OBJECTIVES.

The summer school will provide participants with a comprehensive understanding of how sensors, electronics, data analytics, and system integration work together to solve complex challenges. The programme bridges foundational science with practical, domain-specific applications across the five focus areas.

Focusing on the expected outcomes, by the end of the programme, participants will have gained a comprehensive understanding of micro- and nano-technologies for micromachining and the design of sensors and transducers, covering everything from fundamental design principles and materials to fabrication processes and system-level integration.

Through a combination of focused lectures and hands-on activities, students will develop practical skills in prototyping, data acquisition and analysis, as well as in applying these techniques to real-time and large-scale scenarios. Thanks to its interdisciplinary structure, the school will enable participants to apply sensor-based solutions, novel measurement systems, and innovative electronic devices across diverse fields such as sustainable agriculture, cultural heritage preservation, environmental protection, healthcare, and smart energy and mobility. Participants will learn how to tailor their expertise to address the specific needs and challenges of each domain.

6. COURSE ORGANISATION.	
UNITS	
1.	Module 1: Sustainable Agriculture (Prof. Anna Maria Gueli / Prof. Clara Casado)
2.	Module 2: Cultural Heritage Preservation (Prof. Giuseppe Politi / Prof. Diego Garate Maidagan)
3.	Module 3: Environmental Protection (Prof. Denis Michez / Prof. Angelika Charkiweicz)
4.	Module 4: Healthcare (Prof. Robert Bucki / Prof. Ewelina Piktel)
5.	Module 5: Smart Energy Mobility (Prof. Mohamed Rguiti / Prof. Tanya Politi)
LEARNING RESOURCES AND TOOLS.	
Learning resources and tools will be uploaded to EUNICE Moodle Platform in advance.	
PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.	
The training activities will be of a theoretical or practice nature. The teaching methodology will be active, seeking the participation of students with the teachers as well as in groups. The course will be developed using the EUNICE Moodle Platform. On this platform students will find presentations, lectures, notes, assessments, activities and any compulsory readings corresponding to each module.	

7. ASSESSMENT METHODS, CRITERIA AND PERIOD.

ONLINE (mandatory): asynchronous online studies, to be delivered by all lecturers where students will work. The online module is an icebreaker prior to the social and cultural dimension of the experience in Spain. Students will interact and know each other, to get prepared with some foundations for the courses. The overall framework must be such that each individual work with everyone else of the whole group, making a cohesive cohort, before they arrive in June for the physical attendance of the 5 days in UC.

Face-to-Face courses: each lecturer will present their modules in each day (as described in the Course Syllabus above) establishing their theoretical/practical foundations. Each instructor will have their own assessment, it could be Q&A, written and or oral presentation in groups, or any acceptable measurement of achievement of learning outcomes in a module per module basis. The cultural and social activities during the 5-days face-to-face in June will be an integral part for the whole 3 ECTS Summer School.

Assessment will be based on:

- Class attendance (minimum 90%).
- Group Works
- Quizzes

OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.

Bibliography and teaching materials will be uploaded to EUNICE Moodle Platform prior to the start of the course. The EUNICE Moodle Platform will aggregate all above courses and modules conducted for Online + Face-to-Face and clear assessment, ranking and grading will be available for each student to check their performance and successful completion of all activities.