

TRANSPARENCY FORM

University Mediterranea of Reggio Calabria
Department PAU
Course of Design L-4
a.a. 2023-2024

Interdisciplinary course of sustainable design

DEPARTMENT	Patrimonio Architettura e Urbanistica (PAU)
ACADEMIC YEAR	2023-2024
DEGREE COURSE	Design L-4
COURSE NAME	Interdisciplinary course of sustainable design- Module I Circular design strategies; Module II Ecodesign
ACADEMIC AREA	Module I SSD ICAR/12, activity B characterizing ; Module II (SSD ING-IND 11, activity A, basic
COURSE CODE	1001690
SCIENTIFIC DISCIPLINARY SECTOR	ICAR/12, ING-IND/11
RESPONSIBLE TEACHER	Prof.ssa Marina Mistretta
OTHER TEACHERS	Prof.ssa Francesca Giglio
CFU / UNIVERSITY CREDITS	Total C U = 12 Module I CU =6 Module II CU =6
HOURS RESERVED FOR PERSONAL STUDY (NUMBER)	180 hours (15 hours for each CU)
HOURS RESERVED FOR EDUCATIONAL ACTIVITIES ASSISTED BY THE TEACHER	120 hours including 60 (Module I including 48 lectures and 12 lectures/workshops)+ 60 (Module II including 48 lectures and 12 lectures/workshops)
CARRYING OUT METHOD	Traditional
PROPAEDEUTICITY	None
VALID IN OTHER COURSE OF STUDY	None
YEAR OF STUDY	II
LESSONS PERIOD	I Semester
FREQUENCY MODE	Mandatory
TYPE OF EVALUATION	* Grading in thirtieths
STUDENT OFFICE HOURS	Wednesdays 12/13 by appointment by email

PREREQUISITES	Due to the complexity of the topics covered, it is useful for students to have learned, during the first year, methodologies and techniques for conceiving a Design project.
GENERAL EDUCATIONAL OBJECTIVES	The course will be based on a working methodology closely linked to current needs and programmatic strategies at a European, national and local level that outline the new scenarios connected to the need to convert linear processes into circular ones, applying the principles of the circular economy to product design and the resulting Circular Design strategies (Design for Circularity). The objective is to identify the innovative dynamics that are triggered in design in order to address the transition process towards the Circular Economy in the industrial sector, leading students to a reflection on the relationship between material innovation and circular economy. Materials are a key element of a product's sustainability and a central and tangible part of the transition from a linear economy to a circular economy. Minimising waste, keeping products and materials in use for longer, using post-consumer materials, converting the linearity of transformation processes towards their circularity, are some of the possible actions of the Circular Design and Ecodesign approach, focusing on product innovation as well as process innovation. For the purposes of the qualifying objectives of the Degree Course, it is intended to make students acquire a systematic working method, built on the basis of a theoretical framework of reference

	<p>on the topics covered. The specific objective is to provide design tools capable of tackling design and technological problems that characterise design solutions that meet the requirements of reversible processes, use of unconventional materials and technologies (reused, recycled, coming from other production chains), guaranteeing ease of assembly/disassembly and energy eco-efficiency.</p>
<p>SPECIFIC EDUCATIONAL OBJECTIVES EXPECTED LEARNING OUTCOMES</p>	<p>Knowledge and understanding The student, at the end of the course, will have acquired knowledge and comprehension skills inherent to: 1) theoretical aspects related to the disciplines and topics addressed related to theories and models on Circular Economy and design strategies for Circular Design; 2) specialized aspects related to the elaboration and development of the technical/executive design of the project proposal; 3) analysis for the improvement of energy and environmental efficiency in processes and systems, in order to reduce their overall impact on the environment, consistent with the relevant specific regulations. Each educational credit, will be completed by the student's specific activity (15 hours for each credit), which will cover his or her own individual study activity, based on the bibliography provided and the indications of the lecturer. The in-depth study and study activity will be characterized by the preparation of the graphic works required as deliverables during the course of the course and which will be deepened and revised in the laboratory moments in the classroom, in collaboration with the lecturer. Such an approach, aims to build the student's repertoire of knowledge and logical/deductive path, outlined by the Degree Course and the objectives set</p> <p>Applying knowledge and understanding The student will acquire a scientific and recognized working method, through which he/she will be able to understand an issue related to Circular Design principles, define the objectives and develop an executive design proposal that transfers one of the design strategies for Circular Design in an innovative way, in line with the objectives of the Degree Course. The student will also be able to know the fundamentals of the LCA methodology, identify the main solutions for improving the energy-environmental performance (ecodesign) of products, services and organizations, and learn about the main environmental labeling systems.</p> <p>Making judgements The student will be led to acquire a critical capacity for judgement, based on the theoretical aspects provided and on design experimentation. This working method therefore requires students to acquire knowledge - on theoretical aspects relating to the relationship between Innovation - Circular Economy - Material experimentation - on the technical/executive aspects related to the choice of circular solutions, with high energy and environmental efficiency, which can be assembled and disassembled. - on the energy-environmental performance of systems and processes as well as products, services and organizations, so as to propose eco-design, energy and environmentally more efficient solutions and finally to evaluate their effectiveness. - On product environmental labeling systems.</p> <p>Communication skills The working method acquired will enable the student to organise the presentation of his/her solution through new representation/communication systems, integrating feedback systems and on the basis of the design and analytical evaluations previously carried out, being clear about the end user with whom he/she is dealing. In addition, the way the course is conducted and that of final evaluation are aimed at developing communication skills on the part of the student to private and institutional stakeholders.</p> <p>Learning skills The student will be able to apply the skills acquired during the lectures. Furthermore, the student will acquire terminologies, languages and descriptive methods that characterise the circular economy applied to the product, LCA methodology, eco-design and</p>

	product environmental labeling systems.
TEACHING PROGRAMME	The detailed program is attached herewith
CARRYING OUT METHOD	The Course will be based on a first part of main lectures, possible seminars by external experts and a second workshop part structured in 4 timetabled intermediate examinations/deliveries, which will constitute the integrated year's exercise for the two courses. The 4 deliveries of the exercise will lead to the elaboration of the final product, discussed and matured during the semester. A guide to the exercise will be given to the students, describing the stages of the work and the timeframe in which they are to be carried out. The workshop part will be developed mainly in the classroom - with some phases in groups - and will continue with individual student work, up to the final product. The aim is to lead the students to the maturation of the project and the final assessment in a joint manner, in order to conduct a shared experience and to optimise the study and learning process carried out consistently during the course.
ASSESSMENT METHOD	<p>Access restrictions: Active class attendance, consistently completed assignments and individual study are an integral part of the course and contribute to the final assessment. In the absence of these aspects, it will not be possible to take the examination in the first session. Attendance is compulsory, only 20% absences are permitted.</p> <p>Type of examination: The examination will consist of an initial theoretical part on the specific topics of the individual courses and the discussion of the final papers, which are common to both courses. The final paper is individual for each student. The papers must be produced in A3 horizontal format boards and a final technical report.</p> <p>Evaluation criteria: The vote, expressed in thirtieths, will be awarded based on the level of achievement of the expected results according to the Dublin indicators. For students who score poorly or withdraw during the test, the professor will assess whether they can take the exam again in the same session or will have to appear only from the next session. It will be given according to the following grading scale: Rating: Grades: Excellent 30 - 30 cum laude: Excellent ability to devise and develop a design of an original and reproducible object; excellent knowledge of the topics and very good ability to make original judgments and evaluations; excellent language and communicative property even on different registers (drawing, presentation, etc.); Very good 26- 29: Good command of topics; full ownership of language; the student is able to apply knowledge to solve proposed problems; Good 24 - 25: Basic knowledge of major topics, fair command of language, with limited ability to independently apply knowledge to solve proposed problems. Sufficient 21 - 23: Does not fully master the main topics of teaching but possesses the knowledge, sufficient ownership Barely sufficient 18 - 21: Minimal basic knowledge of the main topics of teaching and technical language, minimal ability' to independently apply acquired knowledge and make judgments and articulate specialized discourse, and minimal expository and communicative ability</p>
BOOKS ADOPTED	<ul style="list-style-type: none"> • <i>Martinuz M (2021) 100 anni di Design italiano, Lettera ventidue (consigliato per approfondimento)</i> • <i>Munari B. (2017) Da cosa nasce cosa, Laterza (consigliato per approfondimento)</i> • <i>Pellizzari A. Genovesi E. (2021) Neomateriali 2.0 nell'economia circolare, Edizioni Ambiente (consigliato per approfondimento)</i> • <i>Peters S. (2019) Materials in progress.Innovations for designer and architects, Birkhauser Basel (di riferimento)</i> • <i>Vezzoli C. Manzini E. (2017) Design di prodotto per la sostenibilità ambientale, Zanichelli (di riferimento)</i> • <i>Iraldo F., Testa F. (2014). L'impronta ambientale di prodotto per la competitività delle PMI. Franco Angeli Editore, Milano.</i>

	<ul style="list-style-type: none"> • <i>Van Doorselaer K., Koopmans R.J. (2021). Ecodesign. A Life Cycle Approach for a Sustainable Future. Hanser Publisher.</i> <p><i>Reference sitography</i></p> <ul style="list-style-type: none"> - https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview - http://www.circulareconomyasia.org/circular-design/ - www.materialdesign.it - www.materially.eu <p>During the course, the lecturer will make available supplementary teaching materials, useful for the purposes of the exercise</p>
OTHER INFORMATIONS	<p>During the course, in conjunction with the two modules, a possible seminar contribution from industry companies will be provided Subject to availability</p>

DETAILED TEACHING PROGRAM

The key role of Design, widely emphasised by the European strategies related to the European Green Deal, draws attention to the activation of Circular Design and Design for Disassembly dynamics, highlighting the social, economic and environmental impact of innovative and sustainable strategies that place at the centre people and the environment. Recently, the package of proposals presented by the European Commission (Sustainable Products Initiative) aims to offer European consumers more sustainable products, to ensure that all products placed on the EU market are more environmentally friendly, circular and energy efficient throughout their life cycle. Sustainability, Technology, Innovation, therefore, represent three common keys to the approach that the Design project will have to take in the near future.

What emerges is a vision in which it is necessary to redesign the life cycle of components, considering the choice of materials compatibly with available resources and in relation to their possible reuse, thus pushing the need to opt for components that can be assembled and disassembled, with a view to resource circularity. In this context, the course will have a strictly integrated programme: the first part, of a theoretical nature, will describe the scientific assumptions underlying the dynamics of the relationship between Innovation, Circular Economy, Material Experimentation and Life Cycle Analysis, integrating lectures and seminars with the basic and specific bibliography for each topic.

The second part of the course will propose a design experimentation through the re-design of cult design objects of the last 20/30 years, in a Circular Design perspective and using the Life Cycle Assessment methodology as an in itinere verification of the project, with respect to the material and formal choices, in all of its life cycle phases. Preference will be given to the use of unconventional materials (reused, recycled from other supply chains), modular components, with reversibility characteristics, easy assembly/disassembly. The design experimentation is therefore oriented towards the principles of Circular building, Reversible Design, Design Thinking, providing students with scientific and technical skills on the subject, investigating its evolving fields and applying them to the industrial sector. The workshop, through its research and design experimentation, wants to make a contribution to the realisation of some of the Sustainable Development Goals of the UN 2030 Agenda:

- 9 Industry, innovation and infrastructure
- 12 Responsible consumption and production
- 13 Climate Action

Lectures (45 hours)

- The role of design in circular economy goals
- Circular Economy model and supporting tools.
- Design and material innovation
- Circular Design strategies (Design for circularity)
- Circular materials (natural, recycled, advanced)
- Ecodesign: scope and relevant legislation.
- Life Cycle Assessment. Methodological principles and steps, application examples.
- LCA to support eco-design and definition of eco-design criteria on LCA
- Eco-labels-Environmental Product Declarations and reference standards

Exercises (70 hours)

The exercise will be structured into 4 main phases/deliverables that will lead to the development of the final product, discussed and matured during the semester. The phases of work are based on the methodology of Circular Design Thinking and the Circular Design Guide of Ellen Mc Arthur Foundation , i.e., a strategic design methodology aimed at identifying new circularity opportunities and creating sustainable outcomes.

The 4 main phases of Circular Design Thinking and its applied LCA methodology , will structure the integrated work of the two courses, with set deadlines:

- Understand - Delivery 1
- Define (Definition) - Delivery 2
- Make (Development) - Delivery 3
- Release - Delivery 4

The 4 deliverables of the exercise will lead to the development of the final product, discussed and matured during the semester.

An exercise guide will be given to students in which the steps of the work and the timeframe through which to accomplish them will be extensively described.

Other (e.g., seminars, laboratory activities, guided tours etc.) **(5 hours)**

Possible seminars (subject to availability) from industry companies

