Degree course	Magistral Single-Cycle "Architecture"
Course code	ARM82
Lecturer:.	dott. Martino Milardi. Ricercatore Confermato
Course name:	Energy and Sustainability of the Project
Disciplinary area:	B
Disciplinary field of science:	SSD ICAR 12
University credits - ECTS	6
Teaching hours	60
Course year	V
Semester :	first semester

Brief description of teaching and learning objectives

The Course of Energy and Sustainability Project focuses on the objectives of a culture of buildings linked to decisions that internalize assumptions, procedures, techniques and methods of intervention, about paradigms: Eco-efficiency, Energy and Materials flows, Renewable Energy Sources, Life Cycle, Relationship-Building Context, Integration systems, then, the environmental and social dimension of sustainable development, in the wake of the Control Technology of cycles that underlie the use of primary resources. The intent is to provide methodologies and tools necessary to solutions for improving the energy efficiency of 'building and plant integration for the reduction of consumption and production from renewable sources, and compliance with ecological materials.
More general objective is to lead the student to the realization that construction activities involving human activity, quality of life, the environment, energy and material resources in order to better understand the process that leads to the "building construction", through an approach as requirement-performance of the entire life cycle. In this light, next to the cognitive framework complete sector regulations will be implemented an applicative systems, structural elements that perform at a high environmental quality and eco-efficiency, with the aim of adapting the building work to the trajectories of technological innovation.

Prerequisites

Students, during the initial verification aimed at the construction of the training targets, must demonstrate knowledge and basic models is that object-critical interpretation through the study of new theories and practices of the correct use of the natural resources of the technologies, such as highlight the ability to propose solutions aware of in terms of its sustainability and efficiency in terms of design principle inseparable from culturally and disciplinary action with the design problem identified. In summary, will test the ability to apply knowledge and understanding in the critical reading and interpretation of complex contexts to, the ability to explain in a clear and complete their project ideas and the results of their research work.

Course program

The programmatic articulation of the course is based on the intent to provide the student with the basic tools of knowledge to set a correct approach to the energy aspects of environmental quality (outdoor and indoor) that make up the disciplines most innovative and able to determine significant results in the medium on the side of the environmental impact and therefore the sustainability of the built environment. The use of renewable energies and reducing the emission of CO2 developments are better able to influence this aspect.
You want to make gain further knowledge of the relationships in the construction of the architecture are established between form and content, including the use of materials, their performance as well as the different types of energy (and sources thereof), which are involved in the different realization processes, in order to integrate and apply the knowledge and the development of materials and the implementation of new technologies in the energy field. More generally aim of the course is thus defining the criteria to deal with the cultural foundations and methodological correct the problems related to materials, energy saving, energy efficiency, the use of sources.

The course is divided into modules of lectures and seminars and simulations, experimental teaching, which cover the following areas of interest:
- Patterns of behavior energy / environmental impact of buildings and evaluation processes;
- Methods and Techniques for reduction of energy consumption of primary resources and no;
- Design and Retrofit aimed at active and passive control of energy flows;
Subsequently the 'articulation will then be oriented according to the Macrophases:
- The dimension of sustainable architecture paradigms foundational assumptions established and future scenarios;
- Criteria of evaluation of the environmental and energy performance of the building cycle between LCA / LCI or life cycle assessment and eco-profiles,
- The environment as a project item
- The theme of integration building / facilities in the design of new and retrofit actions.
- Project strategy and technical solutions for the operation of the environmental energy in buildings
In summary, we follow two training phases, relating respectively to learning theoretical base, and the other more operational, practical application of the concepts presented ex cathedra made concrete by a Theme of Practice that will be investigated and developed during the course.

Expected Results (acquisition of knowledge by the student)

The course, wants to be a sustainable design, suitable for workshop activities, addressing in-depth analysis of the project in a time when the design process is increasingly characterized by interdisciplinary competences. In this sense, the course aims to get to form in the student the ability to formulate independent critical paths aimed at the understanding of the main problems present.
The main objective of the course, given the complexity of the problem addressed, is the spread of a culture of interdisciplinary, conscious and innovative.

Type of Learning Activity

Lectures (hours / year in the classroom) 30
Tutorials (hours / year in the classroom):20
Practical activities (hours / year in the classroom):10

Self-employment of the student

Due to the objectives set, the activities outside of teaching hours delivered are related to research themes to be returned or summary reports or translation recognizable on the sample project. In specific cases, may require the demonstration of autonomous on-site visits at companies and companies in the production, through the production of photographic report commented, drawings of analysis and study, etc. ..

Assessment methods

During the course of the midterm will be carried out aiming to evaluate the advances. These will be verified by deliveries of intermediate reports on the subject of annual exercise, with the quick test in the classroom, with the revision of the intermediate exercises and possible talks.

Suggested reading materials

Bibliography

- Olgyay, V. (1981) *Progettare con il clima*, Muzzio Editore, Padova (I);
- AAVV, (2007), *The Procura+ Manual. A Guide to Cost-Effective Sustainable Public Procurement*, Local Governments for Sustainibility ICLEI European Secretariat GmbH, Freiburg (D);
- AAVV, (2010) *Proceedings of Design, Technology, Refurbishement and Management of Buildings;* 37º IAHS World Congress on Housing Science, Gráficas Iguña, s.a., Santander, Spain (E);
- Clemente, C., De Matteis, F., a cura di, (2010), *Strategies for urban space, excellence in design, performance in building,* DEI, Roma (I);
- Lucarelli, M, a cura di, (2010), *Gestione sostenibile delle risorse energetiche nei settori dell'edilizia e degli impianti*, Centro Stampa d'Ateneo, Reggio Calabria (I).

Link on the Web
Will from time to time determine the most reliable and recurring portals in the construction industry, because of the single items or sections of the program in progress. Alike will be accompanied by links necklaces magazines and online, that in free mode can provide all the technical information useful to their studies.

Other Teaching Materials
During the course will be provided audiovisual, multimedia and simulation teaching useful survey on the themes of "realization" of contemporary design architecture, which now incorporates more and more necessary, the issues of Sustainability and Energy.