



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Architettura		
<b>ACADEMIC YEAR</b>	2020/2021		
<b>MASTER'S DEGREE (MSC)</b>	ARCHITECTURE		
<b>SUBJECT</b>	ENVIRONMENTAL TECHNICAL PHYSICS		
<b>TYPE OF EDUCATIONAL ACTIVITY</b>	A		
<b>AMBIT</b>	50662-Discipline fisico-tecniche ed impiantistiche per l'architettura		
<b>CODE</b>	03324		
<b>SCIENTIFIC SECTOR(S)</b>	ING-IND/11		
<b>HEAD PROFESSOR(S)</b>	MILONE DANIELE	Professore Associato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>			
<b>CREDITS</b>	6		
<b>INDIVIDUAL STUDY (Hrs)</b>	96		
<b>COURSE ACTIVITY (Hrs)</b>	54		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>MILONE DANIELE</b></p> <p>Tuesday 10:00 11:30 Dipartimento D.I. Edificio 9 stanza T2004 (2° piano) Viale delle Scienze</p> <p>Wednesday 12:00 13:00 Per la sede di Agrigento durante la pausa prevista, previa prenotazione</p>		

DOCENTE: Prof. DANIELE MILONE

<b>PREREQUISITES</b>	Basic knowledge of maths and physics
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding            Knowledge of physical and environmental phenomena, as well as technologies, required for make buildings efficient and comfortable. Understanding problems and find design solutions in particular dealing with energy uses. Learning of fundamentals of applied physics (units, thermodynamics, heat and mass transfer, acoustics, lighting). Learning of analysis ability.</p> <p>Applying knowledge and understanding            Learning of methods and tools able to fulfil design objectives related to indoor thermal comfort, visual comfort, energy uses. Knowledge of laws and standards about energy performances of buildings and energy certification.</p> <p>Making Judgements            To be able to assess "energy and environmental qualities" of the built environment. To be able to understand how architecture features interact with the previous requirements. Make own design choices not only considering standards guidelines and limitations.</p> <p>Communication skills            Team working with other professionals and stakeholders. Approach holistic design. Go ahead "greenpainting" of projects: be confident of analysis and calculations to support the quality of the project.</p>
<b>ASSESSMENT METHODS</b>	<p>During the course, when lectures are suspended, there will be two written tests (mid-term and final testing) relating to the topics.            There will be at least 10 question per test. Questions need either closed and open answers. Each answer must be adequately commented. The teacher will assess: basic knowledge, mastery of language and the capacity to build relationships among theory and practical applications. Students that will fail one or both the written test can have access to an oral examination related to the failed test topics.            Final mark will be a synthesis of the two ranked in the tests (arithmetic average) of the results obtained in the written tests and oral tests (relating to the topics of the written tests not passed by the students).            Rating votes: excellent 30/30 e lode: excellent knowledge of the topics, excellent mastery of language, good analytic capability; the student is able to apply his knowledge to solve the proposed problems.            Very good 26-29: good knowledge of the subjects, full mastery of language, the student is able to apply knowledge to solve the proposed problems.            Good 24-25: basic knowledge of the main topics, basic command of language, limited ability to independently apply the knowledge to the solution of the proposed problems            satisfactory 21-23: the student does not have full capabilities but has the knowledge, satisfactory command of language, poor ability to independently apply the knowledge            sufficient 18-20: student has minimal knowledge of topics and minimal technical language, very little or no ability to independently apply the knowledge            insufficient: the student does not have an acceptable knowledge of the topics</p>
<b>EDUCATIONAL OBJECTIVES</b>	<p>The course aims to provide basic knowledge about energy, heat, light and sound laws.            In detail, first topics deal with thermodynamics (quantity and quality of energy)and heat and moisture transfer. Afterwards, thermal comfort, light and sound fundamentals will give the knowledge to assess the quality of close spaces. Moreover, standards and procedures for energy certification of buildings will be studied.</p>
<b>TEACHING METHODS</b>	Lectures, exercise in team working
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>Slides e dispense distribuite dal docente (Notes and slides distributed by the teacher)            Fisica Tecnica Ambientale – Yunus A. Cengel (G. Dall'O', L. Sarto), McGraw-Hill            Magrini A, Maggioni L.: La progettazione degli impianti di climatizzazione negli edifici, EPC Libri</p>

## SYLLABUS

Hrs	Frontal teaching
1	Introduction (energy, environment and architecture)
3	Fundamentals of applied physics: heat, energy, power and their units
8	Thermodynamics
8	Heat transfer in stationary conditions: conduction, convection, radiant transmission
6	Properties of construction materials. Insulating materials. U value
4	Italian Standards and Laws for energy performances of buildings. Energy certification

## SYLLABUS

<b>Hrs</b>	<b>Frontal teaching</b>
4	Thermal comfort in indoor spaces. Indoor Air Quality
6	Fundamentals of lighting. Visual comfort
6	Acoustics for architecture

  

<b>Hrs</b>	<b>Practice</b>
8	Design of thermal insulation and control vapour condensation in vertical walls, Calculation of reverberation time, calculation of illuminance values