



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Architettura		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	SPATIAL PLANNING		
INTEGRATED COURSE	ENERGETIC POLICIES FOR THE TERRITORY+SUSTAINABLE MOBILITY POLICIES - INTEGRATED COURSE		
CODE	21070		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	ING-IND/11, ICAR/05		
HEAD PROFESSOR(S)	LA GENNUSA MARIA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	LA GENNUSA MARIA	Professore Associato	Univ. di PALERMO
	MIGLIORE MARCO	Professore Ordinario	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>LA GENNUSA MARIA</p> <p>Thursday 12:00 14:00 Dipartimento di Ingegneria, Edificio 9, Studio 2009, secondo piano.</p> <p>Friday 10:00 12:00 Dipartimento di Ingegneria, Edificio 9, Studio 2009, secondo piano.</p> <p>MIGLIORE MARCO</p> <p>Tuesday 09:30 11:30 Stanza propria area Trasporti e Geomatica del DICAM</p> <p>Thursday 09:30 11:30 Stanza propria area Trasporti e Geomatica del DICAM</p>		

PREREQUISITES	Basic knowledge of energy sources and their use at local and territorial level.
LEARNING OUTCOMES	<p>KNOWLEDGE AND COMPREHENSION ABILITIES Students, at the end of the course, will have acquired knowledge and methodologies to address the issues related to the use of energy resources both at local and territorial level and to transportation planning in the context of environmental sustainability. The students will be able to: - develop a sound knowledge and understanding of the socio-economic, energetic and territorial processes, with a particular focus on the effects of policy on environment. - develop an understanding of the factors which explain territorial changes, and an understanding of the different conceptual/theoretical approaches used to analyse processes of energetic and spatial change; - critically analyse energy problems as a result of policy decisions that fall on the population and, at the same time, to recognize the role, the opportunities and the limits that energy policies have on the territory; - evaluate technologies and methods for achieving energy saving objectives; - assess development scenarios of energy policies, both locally and on a large scale; - assess the different strategies for increasing the environmental sustainability of the transport system and of the territory in the short, medium and long period of time.</p> <p>ABILITY TO APPLY KNOWLEDGE AND COMPREHENSION The course includes both lectures and the development of an individual or group exercise. The lectures will then be followed by a practical where students will use the tools and skills they have learnt during the lectures. Upon successful completion of the module, students will be able to: - Identified more suitable methods of analysis to address energy and mobility problems on the territory. - Applied energy analysis methods to describe and explain the urban context and to estimate required interventions. – Identified place and goal of specific objectives, which are measurable, attainable, relevant and time-bound. - Identified the engagement strategies of stakeholders in decision making. - Assess the effect produced by different intervention scenarios on energy policies and pressures in the environment. - Produced an energy development and/or regeneration plan of territory.</p> <p>JUDGEMENT AUTONOMY The student's autonomy of judgment is stimulated through a focus on qualitative methods, practices such as active listening and participant observation, and guided site visits to innovative energy production facilities. Knowledge of integrated methods of analysis will enable the student to act independently to address different energy issues and to formulate hypotheses for spatial development based on the proper use of energy sources. Teaching tools used to stimulate independent judgment include group and interactive area surveys, classroom debate, questionnaires and informal surveys. The students shall: - demonstrate the ability to take part a decision-making process that is in the field of energy planning and design informed by relevant scientific, social and ethical aspects; - demonstrate an awareness of the crucial effect of energy design on humans' living environments and of the ethical aspects of research and development in the territory.</p> <p>COMMUNICATION ABILITIES By the end of the module, students should have: • Orally and visually presented complex information in a clear, concise, persuasive, attractive manner. • Researched and summarized meaningful case studies. • Selected and used graphic tools (diagrams and maps) to communicate information and ideas. • Justified, argued and communicated the results of the analysis and design choices. The structure of course and the type of the final exam are strongly aimed at enhancing the capacity of the student towards external consumer communication, both institutional and private.</p> <p>LEARNING ABILITIES The aim of the course is to develop students' skills in energetic analysis, visualisation and basic statistics, in order to increase their knowledge of energy processes, energy and environmental issues and to address new issues regarding the environmental sustainability. To this end, the course includes a group practical regarding the energy improvement of an urban or suburban area. The course aims to provide students with cross-cutting viewpoints on energy-environmental issues through a multi/interdisciplinary approach. In this way, students will be able to understand the energy system and its problems.</p> <p>EDUCATIONAL OBJECTIVES The course is designed to give future urban planners the competence and skills required for the preparation, communication and implementation of an energy planning tool. The course aims to convey the basics that allow the student to address the energy problems and environmental impacts of the human activities on the environment, both at the urban level and at a more extended scale.</p>

ASSESSMENT METHODS	<p>The assessment of learning will be carried out through an oral examination along with a presentation of analytical and meta-design maps. Moreover, the student will be able to undergo an intermediate examination, relating to one of the two modules of the integrated course.</p> <p>EVALUATION CRITERIA Evaluation criteria include individual performance (class attentiveness and participation, performance on exam), team performance (performance on exam and in studio project). Student performance on studio project will be assessed according to three primary criteria: (1) appropriateness of student responses, (2) quality of rationale provided to support student responses, and (3) quality of maps. The student will have to answer at least four oral questions for each module, on all of the topics described in the list below (see "SYLLABUS"). At the same time, the student will have to justify the decisions made about the urban area selected as case study. The final evaluation aims at appraising whether the student possesses a good knowledge and comprehension of the topics, and whether he/she has acquired the ability to apply energy analysis methods and to use energy planning tools.</p> <p>As regard "Energetic policies for the territory" module, questions will concern: 1) Energy sources, carriers and energy utilities; 2) Energy systems for processing and transportation of energy; 3) International, European and national energy policy; 4) The Energy Planning.</p> <p>As regard "Policies for a sustainable environment" module, questions will concern: 1) Urban Traffic Plans; 2) Urban Mobility Plans; 3) transport demand and supply modelling; 4) public transport systems.</p> <p>The lowest evaluation grade will be achieved if the student proves his/her knowledge and comprehension of the main subjects, at least within a general framework, and can apply that knowledge (i.e., is able to draw the maps, to analyze energy and environmental data, and so on). The student shall also be able to present to the examiner, while competently discussing, the topics related to planning practices and theory in a successful way. Below that threshold, the student will not be able to pass the examination. On the contrary, the more the student will be able to interact with the examiner and discuss the topics, and the more he/she will prove to have acquired the basics of energy planning theory and of the techniques of energy planning and transport planning, the higher will the evaluation grade be. The evaluation grades range is comprised between 18/30 and 30/30.</p>
TEACHING METHODS	Lectures, Seminars, Inspections, Revisions of projects.

MODULE SUSTAINABLE MOBILITY POLICIES

Prof. MARCO MIGLIORE

SUGGESTED BIBLIOGRAPHY

Lecture outlines and slides will be provided by the professor.

It is also advisable to study the following texts:

1) Rupprecht Consult - Forschung & Beratung GmbH (editor), Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, Second Edition, 2019.

2) Ortuzar J de D, Willumsen L.G., Modelling Transport. Edition: Fourth edition. John Wiley & Sons, Ltd. ISBN: 9780470760390

3) ITE (Institute of Transportation Engineers), Meyer, M. D., Transportation Planning Handbook. Edition: Fourth edition. Hoboken, New Jersey, Wiley, 2016. ISBN: 9781118762356.

AMBIT	50458-Ingegneria e scienze del territorio
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48

EDUCATIONAL OBJECTIVES OF THE MODULE

The course provides a broad overview of transportation planning in urban areas and sustainable mobility policies. The course is divided into 3 sections. 1) Transport plans: the first section analyses the main elements, the development process, and the implementation process of Urban Traffic Plans and Sustainable Urban Mobility Plans. Actions and policies typically implemented in PUT and SUMP are also examined. 2) The transportation planning process: this section provides a broad introduction to the transportation planning process, analyzing the traditional models for transportation supply modeling, travel demand modeling, and traffic assignment. Exercises on transportation supply models and travel demand models are proposed. 3) Sustainable mobility policies: this section analyses the different policies and measures that can be implemented for increasing the environmental sustainability of the transport system and the territory in the short-, medium- and long term, also using case studies and GIS software. Particular attention is paid to public transport, shared mobility services, walkability, and cycling. At the end of this course, the student will know the structure and development methodologies of the main urban transport plans and will be able to perform common analyzes in transport planning. The student will be also able to use GIS software to carry out several analyzes on the urban transport system and propose sustainable mobility policies and measures that solve transportation issues and are suitable for the territorial context.

SYLLABUS

Hrs	Frontal teaching
6	Sustainable Urban Mobility Plans: objectives, development process, implementation, principles, and policies.
4	Urban Traffic Plans: objectives, development process, implementation and design contents.
4	Supply-side policies.
4	Demand-side policies.
4	Travel demand modelling.
4	Transportation supply modelling and trip assignment models.
8	Public transport systems.
3	Parking in urban areas.
Hrs	Practice
2	Survey methods for transport planning
3	Exercises on travel demand models and traffic assignment models.
6	Case studies in the field of transportation planning.

MODULE
ENERGETIC POLICIES FOR THE TERRITORY

Prof.ssa MARIA LA GENNUSA

SUGGESTED BIBLIOGRAPHY

Educational handouts posted online and available to students.

The following texts, most of which are available in the collections of the university library system, are also recommended for individual topics:

1. Charles F. Kutscher, Jana B. Milford, Frank Kreith, "Principles of Sustainable Energy Systems", Third Edition 2019, CRC Press Taylor & Francis Group.
2. Benoit Boutaud, "Energy Autonomy - From the Notion to the Concepts", 1st Edition 2022, ISTE Ltd and John Wiley & Sons, e-ISBN 9781394164080, ISBN 978-1-78630-834-4, DOI:10.1002/9781119616290.
3. Fanny Lopez, Margot Pellegrino, Olivier Coutard, "Local Energy Autonomy – Spaces, Scales, Politics", Vol.1, 1st Edition 2019, ISTE Ltd and John Wiley & Sons, e-ISBN 9781119616290, DOI:10.1002/9781119616290.
4. Eklas Hossain, Slobodan Petrovic, "Renewable Energy Crash Course - A Concise Introduction", 1st Edition 2021, Springer Cham, e-ISBN 978-3-030-70049-2, DOI:10.1007/9783030700492.
5. Iwona Bąk, Katarzyna Cheba, "Green Energy - Meta-analysis of the Research Results", 1st Edition 2022, Springer Cham, e-ISBN 978-3-031-12531-7, DOI:10.1007/9783031125317.
6. Elaine A. Moore, "Explaining Renewable Energy", 1st Edition 2023, CRC Press Taylor & Francis Group, DOI: 10.1201/9781003294337.

AMBIT	20963-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	102
COURSE ACTIVITY (Hrs)	48

EDUCATIONAL OBJECTIVES OF THE MODULE

The "Energetic Policies for the Territory" course aims at providing students the basic knowledge to address the energy and environmental problems that govern the impacts of the anthropogenic activities on the natural environment, both at the urban level and at a more extended scale. To this end, the course aims to encourage students to develop scientific curiosity towards the territory and the use of renewable and non-renewable energy sources, by means qualitative and quantitative models of assessment and estimate. The analytical methods presented refer to national and European standards. It also presents an overview of energy technologies, both in civil and industrial sectors, make use of renewable sources.

SYLLABUS

Hrs	Frontal teaching
2	Introduction: the relationship among energy, territory and environment. Integration of Urban Development Planning and Energy Planning.
2	Video viewing on energy use and the environmental, economic and social consequences.
4	Fundamentals of energy. The various forms of energy. The principle of conservation of energy. The quality of energy and its degradation. The irreversibility in the transformation processes. The concept of exergy.
4	The human energy requirements. Historical data on energy consumption. Energy balances in different historical periods. Primary energy and electricity needs. Per capita energy consumption. Forecasting energy needs. Distribution of energy on the territory: carriers and energy utilities.
8	The different forms of primary energy. All primary energy sources: exhaustible energy sources, almost inexhaustible and renewable energy sources.
2	Solar energy. The Sun and the extraterrestrial solar radiation spectrum. Sun-Earth interaction. Solar paths. Relation between extraterrestrial solar radiation and terrestrial solar radiation. Shadows.
12	Energy systems for processing and transportation of energy. Solar thermal technologies: low, medium and high temperature. Solar photovoltaics. Wind power. Biomass. The hydrogen as an energy source. Geothermal energy. The urban solid waste.
4	La politica energetica internazionale, comunitaria e nazionale. Il piano a valenza energetica: interpretazioni e direttrici di sviluppo.
4	The Sustainable Energy and Climate Action Plan (SECAP). How to develop a Sustainable Energy Action Plan.
2	The future of cities: energy in the process of the smart cities.
Hrs	Others
4	Surveys and inspections of experimental plants used renewable energy sources, within the university campus.