



ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ

ΤΜΗΜΑ ΜΗΧΑΝΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ

ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

Sustainable Energy Systems - Αειφόρα Ενεργειακά
Συστήματα

A8(EN)

«Οδηγός Σπουδών του ΠΜΣ στα ΑΓΓΛΙΚΑ»

“MSc Study Guide”

ΑΙΓΑΛΕΩ 2024

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Article 1

Purpose – Organization

The purpose of the MSc is to provide a high-level postgraduate education in the scientific field of Sustainable Energy Systems. The MSc provides the PSs the possibility to acquire knowledge and expertise in the field of sustainable development of energy systems, through the teaching of eight (8) courses and the preparation of a Master's Thesis (MScTh). The MSc, through the two specializations offered (Renewable Energy Systems and Sustainable Energy Systems Design), focuses and aims to provide high-level, innovative and modern specialization to professions related to the development of sustainable energy systems and new trends in them.

Aiming to that, in the first semester, students attend three courses. The two courses purpose is to strengthen the basic knowledge of PSs required, to acquire the necessary epistemological background of the sustainable energy systems design. The third course introduces them to the field of research methodology and prepares them for the organization of research within the framework of the MScTh. Also, in this course, students acquire the necessary theoretical background for writing comprehensive research proposals and papers.

In the second semester, students attend two in-depth courses on environmental and financial aspects of planning sustainable energy systems. The third course of the second semester is an optional course, enabling the PSs to choose one of the three courses offered -depending on their orientation and interest.

In the third semester, PSs attend two elective/ specialization courses depending on the direction they will choose. The courses of the specializations are designed so that the PSs acquire the skills needed to cope with the modern demands of their professional and/or academic careers.

In the fourth semester, the PSs attend a course dedicated to the elaboration of their dissertation, during which the bibliographic review and the development of the MScTh implementation methodology is carried out. The course concludes with the presentation and examination of the MScTh, carried out by a three-member committee of professors.

Upon completion of the MSc, the PSs will be able to:

- develop leadership skills and competencies for senior and top management positions of responsibility in companies operating in related sectors,
- analyze problems, synthesize solutions, and benchmark alternative approaches,

- work harmoniously in a team, present research results accurately in written or oral form,
- have developed and demonstrated an awareness of the ethics and rules of research, of the individual, social, economic, and environmental dimensions, and consequences of its results,
- develop their research interests to continue their studies in the third cycle of doctoral studies in the field of energy systems,
- contribute to shaping the future direction of the industry linked to the broader concept of sustainable energy systems,
- address current energy issues and the future of the energy industry, through the integration of technologies with management strategies,
- develop problem-solving skills and the ability to apply these skills to developing innovative solutions for the practical needs of society.

Article 2

Number of Entrants, Criteria and Method of Selection

The maximum number of admissions to the MSc "Sustainable Energy Systems" is set at sixty (60) students per year, thirty (30) students in the specialization Sustainable Energy Systems Design and thirty (30) students in the specialization Renewable Energy Systems and the minimum number of admissions is set at fifteen (15).

Criteria and Method of Selection of Admission:

I. Call for expression of interest

Candidates are informed by the call for expression of interest of the MSc, which is published on the websites of the MSc, the Department, the UNIWA and any other appropriate medium. The call for expressions of interest shall contain all relevant information (dates, place of submission of the application, necessary supporting documents to accompany it), as well as the criteria for evaluating the candidates' applications concerning the necessary supporting documents, the application procedure and the deadline for submission of applications.

The call for expressions of interest shall state:

- 1) the conditions for participation of MSc candidates in the selection process,
- 2) the categories of graduates and the number of applicants,
- 3) the selection procedure and criteria for the selection of MSc candidates,
- 4) the deadlines for submitting applications,
- 5) the supporting documents required,
- 6) any other detail deemed necessary to facilitate the selection process of the candidates for the selection of MSc students.

The applications and the required supporting documents shall be submitted to the MSc Secretariat, in paper or electronic form, within the deadline set in the call for

expressions of interest and may be extended by decision of the Mechanical Engineering Department Assembly.

II. Candidate Evaluation Committee (CEC)

The selection of applicants is made by a three-member Candidate Evaluation Committee (CEC) which consists of faculty members of the Department of Mechanical Engineering.

The Committee has the following responsibilities:

- i. Evaluation of all submitted supporting documents (the verification of the completeness of the supporting documents is carried out by the Secretariat of the MSc).
- ii. verification of linguistic competence.
- iii. conducting personal interviews.

The supporting documents for candidates are:

1. Application for admission to the MSc.
2. Copy of degree/diploma or certificate of completion of studies.
3. Academic Transcript.
4. A detailed curriculum vitae listing in detail the candidate's qualifications and any research or professional activities.
5. Evidence of research or professional activity.
6. At least two (2) letters of recommendation.
7. Copy of additional qualifications (e.g. Master's degree).
8. Publications in peer-reviewed journals.
9. A two-sided copy of the identity card.
10. Copy of a certificate of English language proficiency. Proficiency is certified by a recognized qualification (e.g. a qualification from an educational institution in an English-speaking country or an English-language study Program, Advanced Certificate in English, TOEFL certificate with a score of at least 570 points, IELTS certificate with a score of 7.0 and above, State Certificate of Attainment in Languages (level C2)).
11. Additional qualifications, scholarships, special seminars, postgraduate degrees, supplementary education degrees, etc.

Graduates from English-speaking universities are exempted from the requirement to produce a language certificate. Knowledge of other foreign languages will be taken into account.

On completion of the evaluation procedures, the relevant CEC will draw up the list of successful and unsuccessful candidates in order of merit, according to the selection criteria and the weighting factors for each criterion. Successful candidates are those who have obtained a ranking in the order of merit up to the maximum number of students admitted. Candidates who have obtained a ranking in the order of merit above the maximum admission threshold are considered to be runners-up, with the

right to enroll if the top-ranked candidates do not accept the place or do not enroll within the deadline.

In the event of a tie, all tied candidates will be admitted, provided that they do not exceed the maximum number of admissions set out in the call for expressions of interest. If the maximum number of admissions to the MSc is reached, the candidate with the highest degree will be admitted.

The final ranking of the candidates based on the list of criteria of the Program and the proposal for the selection of candidates based on this ranking are submitted to the Department Assembly for ratification.

III. Candidate selection criteria:

CODE	DESCRIPTION	GRAVITY
K1	Degree or diploma Grading in courses related to the academic subject of the MSc Diploma thesis, where this is provided for in the 1st study cycle	30%
K2	Any writing and/or research activity of the candidate	10%
K3	Research or professional experience of the candidate or documented employment in a relevant field or in a related subject	10%
K4	Interview	40%
K5	Adequate knowledge of at least one foreign language in addition to the language of the MSc	10%

$$\text{Grade} = K1 \times 0.3 + K2 \times 0.1 + K3 \times 0.1 + K4 \times 0.4 + K5 \times 0.1$$

IV. Selection process

The required supporting documents must be submitted within the deadlines specified in the respective call for expressions of interest.

The MSc Secretariat receives the applications and the necessary supporting documents submitted by the MSc candidates, which are provided for in the call for expression of interest each time and compiles a list of MSc candidates, which it forwards to the CEC. The supporting documents submitted by the candidates must have been submitted by the deadline, as provided for in the relevant call for expressions of interest. Late applications are not accepted.

The candidate evaluation process includes two stages:

In the first, applications are evaluated based on the completeness and validity of the required supporting documents submitted, which is a necessary condition for qualification to the next stage.

During the second stage of the process, the candidates are invited to an interview before the CEC. The aim is to establish which candidates are capable of effectively meeting the requirements of the MSc, taking into account motivation and interest, but also their overall composition and scientific competence in relation to the subject of the postgraduate Program.

Upon completion of the evaluation procedures, the CEC prepares a complete list of all candidates, ranks the candidates, makes the final selection and draws up the provisional list of successful candidates, which is validated by the DA. It is posted in accordance with the provisions on personal data protection, on the MSc website and in the announcements of the Department.

An objection against the provisional list of provisional students can be made within five (5) working days from the date of announcement of the lists. The objection must be specific and is finally judged by the Three-member Committee of faculty members of the Department who have undertaken a postgraduate project, which is defined by a decision of the DA.

After the expiry of the objection period and the final decision of the objection committee, the final list of provisional students is posted according to the procedure for posting the provisional list.

The successful candidates are invited to respond in writing or electronically (email) within five (5) days from the posting of the final table as defined in the call for expressions of interest to accept their inclusion in the MSc Program and its operating conditions, as described in this regulation operation.

If there are refusals, the Secretariat informs the next candidates in the evaluation order from the final list of successful applicants.

V. Registration in the MSc

Successful applicants must register at the MSc secretariat by the deadlines set by the competent bodies in the call for expressions of interest. For reasons of extreme necessity, it is possible to register a postgraduate student after the deadline by decision of the CC after a reasoned request of the interested party. The admitted PS can be updated from the website of the Department and/or from the MSc Secretariat.

Article 3

Categories of Candidates

In the MSc, graduates or diploma holders of Tertiary Education Institutions of the country or of similar Institutions abroad are accepted in accordance with the provisions of the current legislation. In particular, the MSc accepts, after selection, graduates or diploma holders of Departments of Technology and Sciences or graduates of other related Departments of Higher Education Institutions (HEIs) of the country or abroad, with proven knowledge of the English language. Exceptionally, Graduates of other specialties who demonstrate an appropriate level of Technology knowledge may be accepted.

Final students of Departments can also submit an application, provided that they have presented the Certificate of Completion of their Studies before the date of validation of the list of successful candidates. In this case, a copy of their degree or diploma is provided before the start date of the Program.

Also students of foreign Institutions which are not yet included in the National Register of Recognized Institutions abroad of the Interdisciplinary Organization for the Recognition of Academic Titles and Information (DOATAP) may also submit an application. In the event that a Foreign Foundation is not posted on the DOATAP website, the Department applies the procedure in accordance with what is defined in paragraph 4 of article 304 of Law 4957/2022.

Otherwise, the student will be deleted, without any claim from the student for a refund of the money that may have been deposited.

The competent Secretariat of the Department checks whether the institution awarding the title of a foreign institution belongs to the National Register of Recognized Institutions abroad and whether the type of this title belongs to the National Register of Types of Study Titles of Recognized Institutions posted on the DOATAP website.

Article 4

Duration of Studies - Suspension of Studies

4.1. Duration of study

The duration of the studies leading to the awarding of the Master's Degree of the Program is defined in four (4) academic semesters and the additional time is structured in two (2) semesters, each lasting thirteen (13) weeks of teaching which includes the time for the preparation and submission for judgment of the MScTh.

The permitted duration of completion of the obligations to obtain the MSc Degree is from four (4) (minimum) to six (6) academic semesters (maximum). However, in exceptional cases, suspension of studies may be granted for up to two (2) semesters with the recommendation of the CC and decision of DA and this time is not counted in the total required duration of awarding the MSc Degree certificate.

The duration of the MSc courses per semester of study is at least thirteen (13) weeks, which corresponds to 30 ECTS. The time for writing the MScTh cannot be less than six (6) months and more than eighteen (18) months.

The MSc is completed with the award of MSc Degree Certificate, level seven (7) of the National and European Qualifications Framework, in accordance with article 47 of Law 4763/2020.

The successful completion of studies is established by the successful performance in the MSc courses and the successful preparation of the MScTh.

4.2. Suspension of studies

The PS can -with his application- request a justified suspension of studies (e.g. military service, illness, absence abroad, etc.) provided he presents the relevant supporting documents. The decision is made by DA following the proposal of CC. The semesters of suspension of student status are not counted towards the prescribed maximum duration of normal studies. The right to suspend studies may be exercised once or in parts for a period of at least one (1) academic semester, but the total duration of the suspension may not cumulatively exceed two (2) academic semesters. Students who are suspended from studies lose their student status for the entire duration of the suspension. The PS upon his return to studies is still under the status of studying at the time of his registration as PS.

Article 5

Curriculum

The MSc begins in the winter and/or spring semester of each academic year. The successful examination in all courses of the study Program, the successful preparation of the MScTh are necessary conditions for the awarding of the MSc Award Certificate.

The detailed course schedule per semester as follows:

The courses per semester for the Renewable Energy Systems specialization are distributed as follows:

Course	T	Q	ECTS
Foundations of Energy	M	1	10
Renewable Energy Conversion Technologies	M	1	10
Research Methods & Project Planning	M	1	10
Total 1st semester ECTS (a)			30
Environmental & Social Impact Assessment	M	2	10
Sustainable Energy Economics	M	2	10
Distributed Generation, Energy Storage & Energy Management	O	2	10
Design and Management of Sustainable Energy Buildings	O	2	
Sustainable Transportation	O	2	
Total ECTS 2nd semester (b)			30
Wind/Hydro/Marine Energy Systems	E	3	15
Solar/Bio/Geo Energy Systems	E	3	15
Total ECTS 3rd semester (c)			30
Dissertation	M	4	30
Total 4th semester ECTS (d)			30
Total ECTS of four (4) academic semesters (a+b+c+d)			120

The courses per semester for the Sustainable Energy Systems Design specialization are distributed as follows:

Course	T	Q	ECTS
Foundations of Energy	M	1	10
Renewable Energy Conversion Technologies	M	1	10
Research Methods & Project Planning	M	1	10
Total 1st semester ECTS (a)			30
Environmental & Social Impact Assessment	M	2	10
Sustainable Energy Economics	M	2	10
Distributed Generation, Energy Storage & Energy Management	O	2	10
Design and Management of Sustainable Energy Buildings	O	2	
Sustainable Transportation	O	2	
Total ECTS 2nd semester (b)			30
Optimization of Energy Systems	E	3	15
Technology and Business Strategy – Energy Policy	E	3	15
Total ECTS 3rd semester (c)			30
Dissertation Part B	M	4	30
Total 4th semester ECTS (d)			30
Total ECTS of four (4) academic semesters (a+b+c+d)			120

Table Abbreviations:

- T: Type of course (M=mandatory/ compulsory, O=optional, E=Elective)
- Q: Semester (1=Winter, 2=Spring)
- ECTS: Credit units

COURSE OUTLINES IN THE ENGLISH LANGUAGE

COURSE OUTLINES IN THE ENGLISH LANGUAGE

1. Foundations of Energy

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES1C1	SEMESTER OF STUDY	1 st
COURSE TITLE	Foundations of Energy		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS CREDITS
Lectures and Seminars		3	10
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/foundations-of-energy/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
This course aims to give a very broad overview into the range of issues relevant to energy as a commodity. Given the vast range of topics and disciplines this covers, it will miss out many important aspects, but the aim is to equip the students with enough background information to engage fully with the more detailed courses which follow in the programme. Upon successful completion of this course, the student will be able to: - Analyse the basic engineering sciences underpinning all aspects of Energy, namely thermodynamics, heat transfer, fluid mechanics, and electrical power generation, and put those into context of basic energy conversion technologies. - Analyse over current energy resources, including fossil fuels & renewable resources and gain a broad appreciation of the global and national patterns of energy use. - Evaluate the impacts of energy use on society and environment, as well as address issues of appropriate energy use, energy saving and energy efficiency. - Analyse and identify the main current activities to formulate and implement global and national policies. - Create and apply analytical methods for calculating practical energy applications.
General Skills
- Analysis, creation and evaluation of data and information with the use of the necessary technology. - Working independently. - Teamwork. - Production of free, creative and inductive thinking.

3. COURSE CONTENTS

- Introduction: The Energy Challenge.
- Energy Chain.
- Resources & Fuels.
- Thermodynamics & Thermodynamics Cycles.
- Heat Transfer.
- Fluids Mechanics & Fluids Machines.
- Electricity Generation.
- Electricity Transmission.
- Energy and Climate Change.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	26
	Preparation of Projects	50
	Independent and Directed Learning	135
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Short answer questions. Problem - solving exercises. II. Coursework (40%) (Summative Evaluation) Two (2) personal intermediate Assignments (20%) each with the following evaluation criteria: Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- J. Andrews and N. Jelley. Energy Science: Principles, technologies, and impacts. Oxford University Press, 2007.
- G. Boyle, B. Everett and J. Ramage (Editors) (2003). Energy systems and sustainability. Open University.
- David JC Mackay. Sustainable Energy – without the hot air.
- J. Ramage. Energy: a guidebook. Oxford University Press, 1997, 2nd edition.
- G. J. Aubrecht. Energy. Prentice-Hall, 1995, 2nd edition.
- E. S. Cassedy and P. Z. Grossman. Introduction to Energy – Resources, Technology, and Society. Cambridge University Press, 1998, 2nd edition.
- James A McGovern: The essence of Engineering Thermodynamics, Prentice Hall.
- Y. A. Çengel and R. H. Turner (2001). Introduction to Thermal-Fluid Sciences, McGraw-Hill.
- B. S. Massey (now B.S. Massey and Ward-Smith). Mechanics of Fluids, Taylor & Francis, 2018, 9th edition.
- Edward Hughes (2002). Hughes electrical and electronic technology. Prentice Hall, 8th edition.
- Frank P Incropera, David P DeWitt (2007), Fundamentals of Heat and Mass Transfer, John Wiley and Sons.

2. Renewable Energy Conversion Technologies

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES1C2	SEMESTER OF STUDY	1 st
COURSE TITLE	Renewable Energy Technologies		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/renewable-energy-conversion-technologies/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
This course deals with the introduction and fundamentals of the available and/or projected renewable energy technologies: wind, solar, biomass, geothermal, hydro, and marine energy. Upon completion, students will be able to: - Analyse the operation and related applications of renewable technologies. - Evaluate the strengths and weaknesses of renewable technologies' deployment. - Associate the ethical implications related to the development and implementation of renewable energy technologies. - Discuss the social and cultural aspects related to the adoption of renewable energy. - Identify and assess the emerging technologies and their potential applications that can potentially impact the renewable energy.
General Skills
The teaching/learning content and strategy will help students develop the ability to understand and critically evaluate renewable technologies. In addition, students will develop their ability to analyse and communicate technical information as a key skill for future professional employment.

3. COURSE CONTENTS

- Current energy status, projected demand, and political targets, introduction to a range of renewable energy technologies. - Turbines theory. - Hydropower, large and small-scale, turbines, practical issues. - Wind energy, onshore, offshore, fluid mechanics of wind turbines, practical citation, control, construction issues, wind-resource assessment. - Solar power, solar radiation, solar angles, resource assessment. - Photovoltaics, fundamentals, practical solutions, and limitations. - Solar thermal systems, fundamentals, practical solutions, and limitations. - Biomass, biofuels, applications for heating and electricity generation. - Geothermal energy, resource, energy production technologies. - Wave energy, fundamentals, applications, and potential. - Tidal energy, streams and barrages, fundamentals, wave potential, applications.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY		
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY		
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	26
	Preparation of Projects	50
	Independent and Directed Learning	135
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Short answer questions. Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Experimental coursework for understanding RES technologies. Evaluation Criteria Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- Ahmed F. Zobaa and Ramesh C. Bansal, 2021, Handbook of Renewable Energy Technology & Systems, <https://doi.org/10.1142/q0264>.
- European Renewable Energy Council, 2010, Renewable Energy in Europe: Markets, Trends and Technologies (2nd ed.), Routledge, <https://doi.org/10.4324/9781849775144>
- Jenkins D., 2012, Renewable Energy Systems: The Earthscan Expert Guide to Renewable Energy Technologies for Home and Business (1st ed.), Routledge. <https://doi.org/10.4324/9780203117262>
- European Commission, Directorate-General for Energy, 2022, Clean energy for EU islands: from vision to action: how to tackle transition on EU islands: methodological handbook, Publications Office of the European Union, <https://data.europa.eu/doi/10.2833/822820>.

3. Research Methods & Project Planning

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES1C3	SEMESTER OF STUDY	1 st
COURSE TITLE	Research Methods & Project Planning		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/research-methods-project-planning/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
By the end of the course students should be able to: - Demonstrate the ability to choose methods appropriate to research aims and objectives. - Understand the limitations of research methods. - Develop skills in qualitative and quantitative data analysis and presentation. - Develop advanced critical thinking skills. - Demonstrate enhanced writing skills.
General Skills
Selecting appropriate research methods (qualitative, quantitative, or mixed methods), interpreting and presenting research findings, critically assessing research literature, presenting research findings orally and through written documents.

3. COURSE CONTENTS

1. Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research. 2. Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem. 3. Research Questions and Hypothesis: Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses. 4. Research design: Meaning, Need, Features of Good Design, Concepts, Types. Basic principles of Experimental Design, various methods of Research. Survey, Philosophical, Historical, Experimental, Causal Comparative, Genetic, Case Studies. 5. Tools for Data Collection: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools. Questionnaire and rating scales. Reliability and validity of Research tools. 6. Sampling: Probability and Non-Probability sampling- types and criteria for selection. Developing sampling Frames. 7. Logic: Logical form, deductive and inductive reasoning, consistency, validity, soundness and completeness, western and oriental conception of logic.

8. Writing Research Proposal: Format and style. Review of related literature its implications at various stages of research. (Formulation of research problem, hypothesis, interpretation, and discussion of results). Major findings, Conclusions, and suggestions. Citation of references and bibliography.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Commercial /free/open-source software - Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	-
	Preparation of Projects	76
	Independent and Directed Learning	135
	TOTAL	250
ASSESSMENT METHODS	Submission of a Research Proposal as the final assessment (50%) Written examination with short-answer and critical evaluation questions (30%) Exercises and comprehension tests of the material in workshops (20%)	

5. RESOURCES

- Best, J.W. and Kahn, J.V. (2006) Research in Education. 10th Edition, Pearson Education Inc., Cape Town.
- Kothari, C.R. (2004) Research Methodology: Methods and Techniques. 2nd Edition, New Age International Publishers, New Delhi.
- Mullaney, T.S., Rea, C. (2022). Where Research Begins: Choosing a Research Project That Matters to You (and the World), Chicago Guides to Writing, Editing, and Publishing.
- Turabian, K.L. (2018). A Manual for Writers of Research Papers, Theses, and Dissertations, Chicago Style for Students and Researchers, 9th ed, University of Chicago Press.

4. Environmental & Social Impact Assessment

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES2C1	SEMESTER OF STUDY	2 nd
COURSE TITLE	Environmental and Social Impact Assessment		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/environmental-social-impact-assessment/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
The aim of this course is to provide the candidate with knowledge and understanding of the principles and process of Environmental Impact Assessment. More specifically, the expected outcome of the Module is that the students will be able to recognise the impacts of production systems in the biotic and abiotic environment and, furthermore, will be able to suggest ways for their mitigation. The formal requirements for the development and submission of an EIA report are also amongst the objectives of the Module. The origin of social reactions and their consequences in the permission and implementation of the projects are also developed in the Module.
General Skills
The specific EIA enhances the critical thinking of the students through their understanding of the integrated nature of the environmental problems. The students build capacity in understanding the interactions and strong links between the production processes and their environmental impacts. Contribute to decision-making. The Course enhances independent study as well as working in groups. It encourages working in an interdisciplinary environment, as it covers energy issues from both a technology, environmental and economic perspective. It provides the necessary resources to deal with problems with acuity, synthetic thinking and creativity. It enhances free, creative and inductive thinking

3. COURSE CONTENTS

- Introduction to Environmental Impact Assessment. Module objectives and learning outcomes. Description of the basic EIA terms, the environment, the impacts and the assessment. - European and National EIA Legislation, historical perspectives, needs for continuous advancement of the regulatory framework. - The formal process for project permission with the EIA report submission. Flowchart analysis and description. - The environmental parameters, the significance of the impacts' receptors. - The EIA stakeholders: the public, the consultants, the competent authorities. - Methods and Tools in the EIA. Screening, Scoping, Checklists, Impacts Matrices in the EIA. - Baseline Studies, Analysis and Prediction of Impacts. - Basic Qualitative and Quantitative Prediction Methods and Tools. - Forecasting methods for EIA, qualitative and quantitative forecasting.

- Mitigation of the Environmental Impacts. Alternative Solutions. The Zero Solution.
- Submission of the Environmental Impact Statement. Consultation, Reviewing and Monitoring
- Monitoring and Auditing in EIA.
- The detailed contents of the EIA report.
- EIA of the energy projects, classification, checklists and impacts mitigation.
- EIA of the environmental projects. Classification and impacts mitigation.
- Examples and case studies of other industrial and infrastructure projects.
- The social impacts of the energy projects. Social reactions.
- Beyond EIA: Strategic and Social Impact Assessment
- Links of the EIA process to Sustainable Development issues

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	51
	Preparation of Projects	100
	Independent and Directed Learning	60
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) - Critical theoretical questions for the sound knowledge of the EIA issues and understanding the integrated nature of EIA. II. Coursework (40%) - Quantitative environmental impacts' analysis and development of a complete EIA Report - Evaluation Criteria - Project description - 20% - Impacts identification - 20% - EIA report Quality and completeness - 20% - Documentation - 30% - Critical Evaluation - 10%	

5. RESOURCES

- Fully self-contained course book.
- Relevant scientific papers.
- Publications for real projects EIA.
- The national and European legislation.
- Lecture slides, exercises and practice exams.

5. Sustainable Energy Economics

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES2C2	SEMESTER OF STUDY	2 nd
COURSE TITLE	Sustainable Energy Economics		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/sustainable-energy-economics/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon course completion students will be able to: - Define and explain key concepts related to sustainable energy economic principles and related calculation tools/ formulas i.e. net present value, annual cash flow, rate of return, payback period etc. - Apply economic principles to the analysis and pricing of energy markets. - Understand the economic factors influencing the adoption and development of sustainable energy technologies. - Analyse and evaluate energy policies at local, national, and international levels. - Understand the impact of policy decisions on sustainable energy development and economics. - Design and apply cost-benefit analysis to assess the economic viability of sustainable energy projects. - Evaluate the social and economic benefits of transitioning to sustainable energy. - Critically assess the economic implications of emerging technologies in the sustainable energy sector.
General Skills
- Become acquainted with the economic forces that underpin the energy sector in general and the sustainable energy systems in particular. - Being able to comparative evaluate the cost effectiveness of sustainable energy projects. - Build expertise in economic tools widely used in the evaluation of sustainable energy projects.

3. COURSE CONTENTS

- Demand, supply and the market. - Theory of consumer choice. - Resource allocation and firms. - Inflation, interest rates, expenditure, and taxation. - The economic cycle and the role of energy. - The economics of extracting of non-renewable sources of energy. - Environmental taxes. - Tradable permits. - Market incentives for renewable / sustainable energy. - Environmental valuation. - The cost of climate change.

- Cost-benefit analysis.
- Sustainable energy investments' financial evaluation.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	26
	Preparation of Projects	50
	Independent and Directed Learning	135
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Short answer questions. Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Experimental coursework for understanding RES technologies. Evaluation Criteria Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- Bhattacharyya, S.C. (2019) Energy Economics: Concepts, issues, markets and governance. London: Springer.
- Evans, J. (2011) International Handbook on the Economics of Energy. Cheltenham, UK: Edward Elgar.
- Hau, E. (2013) Wind turbines: Fundamentals, Technologies, application, economics. Berlin: Springer.
- Rubino, A., Sapio, A. and Scala, M.L. (2021) Handbook of Energy Economics and policy: Fundamentals and applications for engineers and Energy Planners. Amsterdam: Academic Press.
- Stoft, S. (2001) Power economics: Designing markets for electricity. Chichester: Wiley-Academy.

6. Distributed Generation, Energy Storage and Energy Management

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES201	SEMESTER OF STUDY	2 nd
COURSE TITLE	Distributed Generation, Energy Storage & Energy Management		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Optional		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/distributed-generation-energy-storage-energy-management/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon successful completion of this course, the students will be able to: - Understand and apply the fundamentals of energy storage and the basics of energy storage technologies. - Understand the specifics of contemporary energy storage applications in the electricity sector. - Understand and apply the basics of distributed generation, demand side management / demand response and electricity systems' flexibility. - Design and techno-economically evaluate energy storage systems in different application settings. - Implement operational strategies on an integrated PV-storage pilot station (self-consumption and/or market coupling). - Develop comprehensive studies on the techno-economic evaluation of integrated RES-storage configurations in typical application settings.
General Skills
- Search for, analysis and synthesis of data and information with the use of the necessary technology. - Teamwork. - Production of new research ideas. - Respect for the natural environment. - Production of free, creative, and inductive thinking.

3. COURSE CONTENTS

- Overview of energy storage applications and services in the electricity sector. - Overview of flexibility aspects for power generation systems – Demand side management techniques and sector coupling. - Principle of operation and main technical characteristics of contemporary energy storage technologies (pumped hydro, compressed air, batteries, flywheels, super capacitors). - Integrated, distributed generation schemes of RES and storage (prosumers, virtual power plants, microgrids, self-consumption and market coupling). - Energy simulations / demonstration of experimental operation for integrated RES-storage systems and conduction of studies.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	61
	Preparation of Projects	100
	Independent and Directed Learning	50
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (50%) (Summative Evaluation) - Short answer questions. - Problem-solving exercises. II. Coursework (50%) (Summative Evaluation) - Set of studies (computational and/or experimental) - Evaluation Criteria - Completeness - 35% - Clearness - 25% - Documentation - 30% - Critical Evaluation- 10%	

5. RESOURCES

- Burheim, Odne Stokke; Reading, Lisa; Reading, Lisa; Rowley, Charlotte, 2017. Engineering Energy Storage, Academic Press, ISBN 9780128141007. - J.K. Kaldellis (Ed), 2010. Stand-Alone and Hybrid Wind Energy Systems: Technology, Energy Storage and Applications, Woodhead Publishing/Elsevier, ISBN: 978-1-84569-527-9.
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7. Design and Management of Sustainable Energy Buildings

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES202	SEMESTER OF STUDY	2 nd
COURSE TITLE	Design and Management of Sustainable Energy Buildings		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Optional		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/design-and-management-of-sustainable-energy-buildings/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon completing the course, students will be able to: - Assess and analyse the concepts, policies and code requirements, methodologies/tools, and processes required for designing, building, and operating sustainable buildings. - Assess and analyse the types/ forms of energy used in buildings. - Assess and analyse the types / forms of renewable energy technologies and how they can be integrated in buildings. - Evaluate buildings' resource-efficiency (e.g. energy- and water-efficiency), environmental and socio-economic performance in various stages of their operation and overall lifecycle. - Assess solutions for new buildings and renovations of existing buildings.
General Skills
- Broad understanding of the key-features of building energy management. - Assessment and evaluation expertise in technologies and design options for sustainable building management. - Ability to set, monitor and report on progress towards specific goals and support the decision-making process.

3. COURSE CONTENTS

- Energy & Environment, the role of the buildings sector. - Energy management, energy audit and energy inspection. - Measurement and instrumentation. - Estimating energy and water consumption, carbon, and greenhouse gas emissions. - Techniques for reducing energy consumption. - Design and construction of nearly and net positive energy and emissions buildings. - Energy efficient building technologies. - Building management systems. - Calculation methods and assessment of sustainable buildings. - High performance building operation, maintenance, and commissioning. - Case studies and examples.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	-
	Preparation of Projects	71
	Independent and Directed Learning	140
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) - Short answer questions. - Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) - Evaluation Criteria - Completeness - 35% - Clearness - 25% - Documentation - 30% - Critical Evaluation- 10%	

5. RESOURCES

- Moss, K.J., 2005, Energy Management in Buildings. Routledge.
- Beggs, C., 2009, Energy: Management, Supply & Conservation. Butterworth-Heinemann. 2nd Edition.
- Kreith F., Goswami, D.Y., 2016, Energy Management and Conservation Handbook, CRC Press, 2nd Edition.
- Littlewood, J.R., Robert J. Howlett, R.J. Jain, L.C., Sustainability in Energy and Buildings 2021, SpringerLink.
- ASHRAE GreenGuide (6th Edition), Design, Construction and Operation of Sustainable Buildings, T. Lawrence, A.K. Darwich, J.K. Means (Editors), 482 p., ISBN 978-1-955516-17-4, Atlanta: ASHRAE (2022).
- Umberto Desideri and Francesco Asdrubali (editors), Handbook of Energy Efficiency in Buildings, A Life Cycle Approach, 1st Edition, 2018.

8. Sustainable Transportation

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES2O3	SEMESTER OF STUDY	2 nd
COURSE TITLE	Sustainable Transportation		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	10
COURSE UNIT TYPE	Optional		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/sustainable-transportation/ https://moodle.uniwa.gr/course/view.php?id=2169 https://eclass.uniwa.gr/courses/MSCES111/		

2. LEARNING OUTCOMES

Learning Outcomes
Upon completion of the course, students will be able to: - Evaluate the significance of sustainable transportation and its role in addressing environmental and social challenges. - Argue and justify the connection between urban climate and climate change from the transportation sector within the framework of circular economy. - Analyse, determine, and compare whether using electric vehicles or conventional ones would constitute an environmentally friendly solution. - Evaluate the importance of environmentally friendly practices in the maritime and aviation industries, along with the roles of green ports and green boats in reducing the carbon footprint of these industries. - Criticise specific methods and strategies for encouraging sustainable transportation behaviours (in the context of personal responsibility and individual actions). - Categorise and differentiate major policy measures needed to support sustainable transportation, justifying the roles of both government and organizations. - Compose future solutions for sustainable transportation to be adopted by a municipality or country, considering their minimal impact on the environment. - Collaborate with fellow students to create and design, both at an individual and group level, a case study from its initial stages up to the final evaluation. Additionally, students should be able to propose new ideas and solutions, applying the principles of sustainable transportation.
General Skills
- Demonstrate the ability to critically analyse and evaluate data and information related to sustainable transportation using appropriate technology and methodologies. - Participate effectively in collaborative team projects, fostering teamwork skills and contributing to the collective goals of sustainable transportation initiatives. - Generate innovative solutions and approaches to address challenges within the field of sustainable transportation, encouraging free, creative, and inductive thinking. - Develop the ability to propose and formulate research ideas within the realm of sustainable transportation, demonstrating a strong understanding of the research process. - Exhibit a sense of social, professional, and ethical responsibility concerning sustainable transportation practices, considering the broader impact on society and the environment.

3. COURSE CONTENTS

- Fundamentals of Sustainable Transportation.
- Climate Nexus: Urban and Global Perspectives.
- International Policy and Environmental Impact.
- Diverse Modes of Sustainable Transport.
- Technology Integration in Transportation.
- Global Best Practices and Case Studies in Transportation Sector.
- Maritime and Aviation Sustainability.
- Infrastructure for Green Mobility.
- Future Trends and Innovations.
- Policy, Behaviour and Sustainable Actions.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	61
	Preparation of Projects	90
	Independent and Directed Learning	60
	TOTAL	250
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) - Short answer questions. - Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Personal and teamwork assignments each with the following evaluation criteria: - Completeness - 35% - Clearness - 25% - Documentation - 30% - Critical Evaluation- 10%	

5. RESOURCES

- EEA, 2022. A Clean Air Programme for Europe — European Environment Agency. URL <https://www.eea.europa.eu/policy-documents/a-clean-air-programme-for-europe>.
- EMEP, 2022. European Monitoring and Evaluation Programme. EMEP. URL <https://www.emep.int/index.html>.
- European Commission, 2021. Mobility and Transport Publications. URL https://transport.ec.europa.eu/media-corner/publications_en.
- Kaldellis, J.K., Spyropoulos, G., Liaros, St., 2017. Supporting Electromobility in Smart Cities Using Solar Electric Vehicle Charging Stations, in: Sayigh, A. (Ed.), Mediterranean Green Buildings & Renewable Energy. Springer International Publishing, Cham, pp. 501–513.
- Kostopoulos, E.D., Spyropoulos, G.C., Kaldellis, J.K., 2020. Real-world study for the optimal charging of electric vehicles. Energy Reports 6, 418–426.
- Spyropoulos, G., Petridou, K., Liaros, S., J.K., K., 2016. Real World Driving Energy Consumption and Air Pollution Implications of Decarbonizing the Greek Transport Sector, in: 1st International Conference Energy in Transportation 2016, EinT2016, Athens, Greece.
- Spyropoulos, G.C., Nastos, P.T., Moustiris, K.P., Chalvatzis, K.J., 2022. Transportation and Air Quality Perspectives and Projections in a Mediterranean Country, the Case of Greece. Land 11, 152.

9. Wind/Hydro/Marine Energy Systems

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES3E1A	SEMESTER OF STUDY	3 rd
COURSE TITLE	Wind/Hydro/Marine Energy Systems		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	15
COURSE UNIT TYPE	Elective/Specialisation track Renewable Energy Systems		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/wind-hydro-marine-energy-systems/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon completion of this course students will be able to: - Understand the operation of contemporary wind, marine and hydro energy applications and related components. - Be able to design wind, marine and hydro energy conversion systems. - Analyze the integration of wind, hydro, and marine energy systems into existing power grids. - Understand the challenges and solutions associated with the intermittent nature of these renewable sources. - Assess the environmental-social benefits/impacts of wind, marine and hydro energy technologies. - Recommend the optimum exploitation solutions for the available wind potential onshore and offshore and perform the appropriate calculations and analyses.
General Skills
- Systematic understanding of wind, marine and hydro energy applications - Enable the evaluation of wind, marine and hydro energy technologies critically and propose solutions. - Develop the basic skills for the planning of wind, marine and hydro energy projects

3. COURSE CONTENTS

- Wind, marine and hydro energy industry and markets. - Wind turbines: evolution, basic principles, and classification. - Wind energy potential; energy yield; aerodynamic analysis. - Mechanical-dynamic loads; electrical parts of wind turbines; control systems and power electronics. - Wind parks design. - Offshore wind power basics and applications- wind energy economics. - Environmental-social benefits/impacts of wind power. - Wave energy basic principles. - Wave energy converters and power conversion mechanisms. - Numerical modelling of wave energy converters; energy yield. - Hydro energy production, efficiency. - Hydro plants: evolution, basic principles, and classification. - Small hydro plants. - Sizing of hydropower plants. - Environmental-social benefits/impacts of hydro energy.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	16
	Preparation of Projects	120
	Independent and Directed Learning	200
	TOTAL	375
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Short answer questions. Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Experimental coursework for understanding renewable energy systems. Evaluation Criteria Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- Comprehensive Renewable Energy Encyclopaedia by Elsevier (2022), Second Edition. Volume 2, Wind Energy, editor J.K. Kaldellis.
- Comprehensive Renewable Energy Encyclopaedia Elsevier (2022), Second Edition, Volume 6, Hydropower, editors P. Karki and R. M. Taylor.
- Cruz João (2008) Ocean Wave Energy: Current Status and Future Perspectives. Berlin: Springer.
- Multon, B. (2011) Marine Renewable Energy Handbook. Wiley.

10. Optimisation of Energy Systems

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES3E1B	SEMESTER OF STUDY	3 rd
COURSE TITLE	Optimisation of Energy Systems		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	15
COURSE UNIT TYPE	Elective/Specialisation track Sustainable Energy Systems Design		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/optimisation-of-energy-systems/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
The objective of the course is to familiarise the students with the rationale, the basic principles, the methods and tools of the energy systems optimization. The module equips the students with the perspective of the optimization in almost all the important energy problems such as their siting, capacity planning, design and operation. In parallel, the students are familiarised with the knowledge and experience for the integrated solution of energy problems and the approach that all the components of a system serve the goal of optimal operation of the entire system that they belong to. By the end of the course, students will recognise the optimisation problems, the suitability of methods and software tools for the solution of the energy optimization problems.
General Skills
The specific Energy Systems Optimization course contributes to the identification of problems with many alternatives and helps to capture these problems in a structured way with optimization models. - It contributes to decision-making. - It enhances independent study as well as working in groups. - It encourages working in an interdisciplinary environment, as it covers energy issues from both a technology, environmental and economic perspective. - It provides the necessary resources to deal with problems with acuity, synthetic thinking, and creativity. - It enhances free, creative, and inductive thinking.

3. COURSE CONTENTS

- Introduction to optimisation. Various practical examples of engineering optimisation problems. Problems with many alternative solutions. The mathematical approach to optimization. - Optimisation using examples from operations research problems and from the energy industries. - The need of energy systems modelling. The usual objectives and constraints of an energy optimization problem. Emphasis on problem formulation and solving. Maximisation and minimization practical examples. - Various techniques for the solution of optimisation problems. The mathematical optimization, advantages and critical issues.
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- Mathematical programming for the solution of optimisation problems. Linear Programming, Integer programming, Mixed Integer Linear Programming. The feasible region. Feasibility and infeasibility of the optimization problems. Two variables problem and the graphical solution.
- Modelling of various energy systems. Energy planning, transportation, fuels mixing, investments planning, capacity planning. Energy Supply Chains, the concept, and examples of novel energy supply chains. Power & fuel supply chains. Efficient energy production and conversion.
- Mathematical Optimisation Software suitable for energy systems. Comparative evaluation - examples and case studies.
- Multicriteria analysis methods, basic concepts. The alternative solutions evaluation. The criteria selection. Weights determination. The Advanced Hierarchical Processing method. Case studies for specific problems: projects' siting, technology selection.
- Scenario analysis for optimization. The hybrid energy systems. Definition, characteristics, modelling. Specific examples of hybrid energy systems configuration, design, and capacity planning.
- The energy - economics optimisation problem.
- Workshops with optimization software. Case studies.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	116
	Preparation of Projects	120
	Independent and Directed Learning	100
	TOTAL	375
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Critical theoretical questions for the understanding and implementation of the optimisation approach Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Assignment to develop and implement an energy system optimisation problem – case study. Evaluation criteria: Problem description -15% Novelty in the problem approach - 20% Model development and problem solution- 40% Quality of written document, literature etc. -25%	

5. RESOURCES

- David M. Himmelblau and Thomas F. Edgar, Optimization of Chemical Processes, McGraw-Hill Higher Education; 2nd edition (1 April 2001), ISBN-10: 0071189777.
- Ibrahim Dincer, Marc A. Rosen, Pouria Ahmadi, Optimization of Energy Systems, 2017, John Wiley & Sons Ltd ISBN:978111889443.
- Knopf, FC. Modeling, Analysis and Optimization of Process and Energy Systems. Wiley, 2012, ISBN: 978-0-470-62421-0.
- Ravindran A., Ragsdell K. M., Reklaitis G.V. 'Engineering Optimisation. Methods and Applications', Wiley, 2nd Edition, 2006, ISBN-10: 8126509333.
- Stanisław Sieniutycz and Jacek Jeżowski, Energy Optimisation in Process systems, 2009 Elsevier, ISBN: 978-0-08-045141-1.

11. Solar/Bio/Geo Energy Systems

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES3E2A	SEMESTER OF STUDY	3 rd
COURSE TITLE	Solar/Biomass/Geothermal Energy Systems		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	15
COURSE UNIT TYPE	Elective/Specialisation track Renewable Energy Systems		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/solar-biomass-geothermal-energy-systems/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon completion students will be able to develop comprehensive knowledge for analysing and evaluating the: - Solar, biomass and geothermal energy market analysis and applications. - Contemporary solar, biomass and geothermal technologies. - The design, performance analysis maintenance and troubleshooting. - The environmental and financial performance of solar energy installations. - The operation of special technological applications like concentrating solar power (CSP), photovoltaic/thermal applications as well as passive solar architecture and building integrated photovoltaics (BIPV). - The environmental impacts of energy systems.
General Skills
Ability to investigate and analyse the optimum exploitation of the available solar, biomass, geothermal potential either for thermal applications (i.e. solar collectors) or for electricity generation (i.e. photovoltaics) and targeted knowledge acquirement in the fields of solar, biomass and geothermal energy integration into power systems.

3. COURSE CONTENTS

Solar
- Solar Radiation Resource Assessment for Renewable Energy Conversion. - Solar Thermal Systems: Components and Applications. - Modelling and Simulation of Passive and Active Solar Thermal Systems. - Solar Collectors, Solar Hot Water Heating Systems. - Solar Space Heating-Cooling Systems, solar Thermal Applications (Heat Pumps, Desalination, Industrial and Agricultural Applications), Concentrating Solar Power (CSP). - Thermal Energy Storage. - Overview of the Global PV Industry. - Solar Photovoltaics Technology, PV Production Technologies. - Prediction of Solar Irradiance and Photovoltaic Power. - Design and Components of Photovoltaic Systems. - Environmental Impacts of Photovoltaic Life Cycle. - Photovoltaic/Thermal Solar Collectors.

- Passive Solar Architecture, BIPV in Architecture and Urban Planning. Geothermal energy - Sources of Geothermal Heat. - Thermodynamics Reservoir management and sustainability. - Concept, resource size, characteristics, methods of stimulation and permeability evolution. - Environmental impacts in energy extraction and energy utilisation. Biomass - Bioenergy concepts – Introduction to bioenergy. - Biomass to heat and power. - Biofuels, advanced liquid fuels, biogas. - Biobased products. - Biomass feedstock for 1st, 2nd, 3rd, and 4th generation of biofuels. - Biomass conversion technologies. - Bioenergy and sustainability.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	Method description	Semester Workload
	Lectures	39
	Class Work/Workshop	16
	Preparation of Projects	120
	Independent and Directed Learning	200
	TOTAL	375
ASSESSMENT METHODS	I. Written Exam (60%) (Summative Evaluation) Short answer questions. Problem-solving exercises. II. Coursework (40%) (Summative Evaluation) Experimental coursework for understanding renewable energy systems. Evaluation Criteria Completeness - 35% - Clearness - 25% - Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- Comprehensive Renewable Energy Encyclopaedia by Elsevier (2022), Second Edition. Volume 1, Photovoltaic Solar Energy. Ed. V.M. Fthenaki, W.G.J.H.M. van Sark
- Comprehensive Renewable Energy Encyclopaedia by Elsevier (2022), Second Edition. Volume 3, Solar Thermal Systems: Components and Applications. Ed. S.A. Kalogirou
- Comprehensive Renewable Energy Encyclopaedia by Elsevier (2022), Second Edition. Volume 5, Biomass and Biofuel Production. Ed. T.M. Letcher.
- Comprehensive Renewable Energy Encyclopaedia by Elsevier (2022), Second Edition. Volume 7, Geothermal Energy. Ed. G. Axelsson.
- Handbook of Biofuels by Elsevier (2021). Ed. S. Sahay
- Handbook of photovoltaic science and engineering by John Wiley and Sons (2010). Ed. A. Luque and S. Hegedus.
- Solar Photovoltaics – Fundamentals, Technologies and Applications, by PHI Learning, (2011), Ed. C. S. Solanki.

12. Technology and Business Strategy-Energy Policy

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES3E2B	SEMESTER OF STUDY	3 rd
COURSE TITLE	Technology and Business Strategy - Energy Policy		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	15
COURSE UNIT TYPE	Elective/Specialisation track Sustainable Energy Systems Design		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscses.uniwa.gr/technology-and-business-strategy-energy-policy/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon course completion student will be able to: - Describe and analyse the current global and regional energy policy landscape. - Identify key stakeholders and their roles in shaping energy policies. - Explain the fundamental technologies and innovations in the energy sector. - Analyse different business strategies adopted by energy companies in response to evolving energy policies. - Assess the role of business models, partnerships, and market dynamics in the energy industry. - Evaluate the effectiveness of different policy instruments in achieving energy-related goals. - Assess the environmental and social implications of energy technologies and policies. - Evaluate strategies for achieving sustainable and socially responsible energy solutions. - Analyse the risks associated with energy projects and strategies. - Anticipate and discuss future trends and innovations in energy technology and policy.
General Skills
- Understanding of the relationship between energy, technology and business. - Development of critical thinking skills to analyse and solve complex problems related to energy policy and business strategy. - Being able to apply a multidisciplinary approach to address challenges at the intersection of technology, business, and policy.

3. COURSE CONTENTS

- Technology Forecasting. - Quantitative and qualitative forecasting methods. Statistical Modelling, Regression Analysis. - Analytical Modelling. - The Delphi Method. - Strategic Planning Tools: The SWOT Analysis. - Examples and Cases of recent Technological Developments. - Technological Innovation. - Research and Development issues. The research and funding activities in the fields of energy and the environment in Europe and Greece. The role of Universities, Research Centres and industries in R&D.
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- Energy Policy.
- Social and Environmental Impact of current/emerging technologies and of energy policy.
- The development of an integrated research proposal.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	80
	Preparation of Projects	120
	Independent and Directed Learning	136
	TOTAL	375
ASSESSMENT METHODS	I. Coursework I (50%) (Summative Evaluation) Assignment in the context of the module Evaluation Criteria Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10% II. Coursework I (50%) (Summative Evaluation) Assignment in the context of the module Evaluation Criteria Completeness - 35% Clearness - 25% Documentation - 30% Critical Evaluation- 10%	

5. RESOURCES

- Lecture slides, exercises and practice exams
- Links to numerous recent publications by UNIWA and other researchers

13. Dissertation

1. GENERAL

SCHOOL	Engineering		
DEPARTMENT	Mechanical Engineering		
LEVEL OF STUDY	Postgraduate		
COURSE UNIT CODE	SES4C1	SEMESTER OF STUDY	4 th
COURSE TITLE	Dissertation		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
Lectures and Seminars		3	30
COURSE UNIT TYPE	Compulsory		
PREREQUISITES	No		
LANGUAGE OF INSTRUCTION/EXAMS:	English		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
MODULE WEB PAGE (URL)	https://mscscs.uniwa.gr/dissertation/ https://moodle.uniwa.gr/course/view.php?id=2169		

2. LEARNING OUTCOMES

Learning Outcomes
Upon completion students will be able to: - Create a clear and well-defined research question or hypothesis. - Develop a comprehensive research plan and methodology to address the chosen research problem. - Critically assess existing literature relevant to the research topic, identifying gaps and areas for further investigation. - Appraise the reliability and validity of data collected during the research process. - Analyse data using appropriate statistical or qualitative methods, depending on the nature of the research. - Demonstrate a capacity for independent and critical thought through the synthesis and analysis of research outcomes. - <i>Develop, present and defend their dissertation.</i>
General Skills
The dissertation module typically aims to develop a range of general skills in students, encompassing academic, research, and analytical abilities. Here are some general skills that students often acquire during a dissertation module: - Ability to formulate clear and focused research questions or hypotheses. - Proficiency in conducting comprehensive literature reviews. - Skill in selecting and applying appropriate research methodologies. - Competence in data collection and analysis. - Critical evaluation of existing literature and identification of gaps in knowledge. - Ability to appraise the reliability and validity of research data. - Competency in analysing data using statistical or qualitative methods. - Skill in interpreting research findings in the context of theoretical frameworks. - Proficient academic writing skills adhering to established conventions. - Clear and coherent expression of ideas and arguments. - Effective communication of research methods, results, and conclusions. - Ability to synthesise information from various sources to form a cohesive argument. - Efficient time planning and organisation to meet project deadlines. - Ability to manage a long-term project and break it down into manageable tasks. - Capacity to identify and address challenges or issues encountered during the research process. - Problem-solving skills in adapting research plans as needed.

- Understanding and adherence to ethical considerations in research.
- Ability to present research findings orally and through written reports.
- Skill in creating clear and engaging presentations.
- Capacity to plan, organise, and execute a substantial research project.

3. COURSE CONTENTS

- Overview of the purpose and structure of the dissertation module.
- Guidance on formulating a research question or hypothesis.
- Assistance in developing a comprehensive research plan, including the choice of methodology and data collection techniques.
- Instruction on conducting a thorough literature review.
- Strategies for critically analysing existing research, identifying gaps, and positioning the study within the broader academic context.
- Discussion on ethical considerations in research.
- Practical guidance on collecting and analysing data.
- Instruction on using statistical or qualitative methods depending on the nature of the research.
- Instruction on preparing for the presentation and defence of the dissertation.
- Tips on creating clear and engaging presentations to communicate research findings.
- Explanation of the submission process and any specific requirements.
- Information on the criteria used for evaluating the dissertation.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	- Commercial /free/open-source software - Audio-visual material and multimedia applications- Moodle, E-class	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	-
	Class Work/Workshop	12
	Preparation of Projects	260
	Independent and Directed Learning	478
	TOTAL	750
ASSESSMENT METHODS	I. Dissertation (80%) (Summative Evaluation) Evaluation Criteria - Background and Methodology - 20% - Results and Evaluation - 30% - Volume of the Work and Skills Demonstrated - 30% - Dissertation Document (Clearness, Language, Length of the Dissertation, structure) - 20 % II. Presentation (20%) - Content of the Presentation / Presentation Structure - 50% - Presentation Skills - 50%	

5. RESOURCES

- Biggam, J. (2017) Succeeding with your master's dissertation (4th ed), London, McGraw-Hill education: Open University Press, ISBN-10: 0 335 22719 8
- Furseth I. and Everett E. (2013), Doing your master's dissertation, Sage Publications, ISBN: 9781446290613
- Rudestam K, and Newton R. (2015), Surviving your dissertation: a comprehensive Guide to Content and process (4th edn), Los Angeles, Sage Publications, ISBN: 9781483354934
- Pears R. and Shields G. (2016), Cite them right: The essential referencing guide. Tenth revised and expanded edition. Palgrave Macmillan, ISBN-10: 1352005131.
- Chivers, B. and Shoolbred M. (2007), A Student's Guide to Presentations, Making your Presentation Count, Sage Publications, ISBN: 9781446222607.

Article 6

Master's Thesis (MScTh)

The PS is obliged to prepare and successfully support the MScTh in the corresponding semester of studies referred to in this Internal Regulation. The subject of the MScTh must be included in the scope of the Msc.

In particular, MScTh drafting issues are defined by the MSc Regulation of MScTh, which includes the following:

1. the educational purpose of MScTh,
2. the stages of submitting the MScTh,
3. the fields of research interest,
4. the stages of carrying out the MScTh,
5. the procedure for changing the MScTh title,
6. the good practices of writing the text and reading the MScTh online or in print,
7. the study and finding of bibliographic sources,
8. the writing of research papers,
9. the MScTh evaluation criteria,
10. the change of supervisor, etc.

Article 7

Student assessment – Exams

At the beginning of each semester and before the start of the MSc courses, it is determined by a decision of the DA after a suggestion by CC and the academic calendar of the MSc is announced to the PSs. The MSc academic calendar lists the starting and ending dates of the semesters, holidays, as well as exam dates.

The CC draws up and announces in time the timetable of the examinations of each examination period no later than ten (10) days before the beginning of the examinations.

The evaluation of the students and their performance in the courses they are required to attend within the framework of the MSc is carried out by written or oral exams or by the preparation of assignments throughout the semester. The evaluation method is described in the outline of each course. The performance in each course is assessed by the lecturer(s) and graded using the applicable, for undergraduate students, grading scale. Specifically, the points given range from zero (0) to ten (10). Passing grades are five (5) and higher. In order to deal with emergency needs or circumstances resulting from force majeure, electronic means may be used for the evaluation of courses, provided that the integrity of the evaluation process is ensured.

The lecturers must take the required care for the examination of Students with Disability (SWD). Both SWD students and lecturers can contact the SWD Professors - Advisors of the Department.

Examinations for SWD are carried out in a climate of respect and acceptance of individuality.

In order for the PS to improve their performance, re-examination is possible in a single course, in which it has been successfully examined, in an examination period that includes the specific course.

If the student fails more than three (3) times in the same course, he may request, with his application to the Director of the MSc, to be evaluated by a three-member committee, which consists of teaching staff from the same or another Department of the UNIWA, with the same subject-knowledge or related to that of the subject to be examined, in which the professor of the subject cannot participate. If the Director of the MSc does not appoint the members of the committee within one (1) month from the submission of the application, the student may request their appointment from the President of the Department.

Article 8

Student Rights and Obligations - Postgraduate Student Removal

8.1. Postgraduate Student Rights

PSs may use the existing infrastructure of the UNIWA which includes classrooms properly equipped with modern teaching aids and computers, the Library, and the facilities of the Department of Mechanical Engineering.

PSs who have no other medical and hospital care are entitled to full medical and hospital care in the National Health System (NHS) with coverage of the relevant costs by the National Health Service Provision Organization (EOPYY) pursuant to Article 33 of Law 4368 /2016 (A' 83), as amended and in force.

PSs are entitled to free meals based on their individual and family financial situation and their locality.

PSs can claim external funding of their studies from various Foundations or bodies of the public and private sector and Research Institutes.

PSs may be financially covered by funded research programs in which they participate. The relevant details are defined by a decision of the CC, after a proposal by the Director of the MSc.

PSs can participate in the student exchange programs (e.g. ERASMUS) of the University or in other research programs of foreign HEIs, within the framework of the Department's transnational agreements with similar institutions and enroll in them as guest students.

The Department of Mechanical Engineering is required to ensure mandatory accessibility to proposed programs and instruction or other accommodations for persons with disabilities and/or special educational needs. These facilities, in accordance with the applicable legislation, should be defined by the Department in detail (e.g. mode of examination, access to teaching areas, laboratories, etc.).

8.2. Obligations of Graduate Students

PSs have the following obligations:

- To attend the courses of the current curriculum without interruption.
- Submit the required assignments within the specified deadlines.
- Attend the prescribed examinations.
- Declare responsibly that the MScTh is not the product of plagiarism, either in whole or in part.
- Pay the prescribed fees as specified in the Internal Regulations of the MSc.
- Respect and comply with the Regulations of Postgraduate Studies, the decisions of the bodies of the MSc, of the Department and of the UNIWA, as well as respect and comply with the academic ethics.

They are required to participate and attend seminars, discussions, conferences/meetings with a subject related to the MSc, lectures or any other scientific event of the MSc. The PSs may perform adjunct teaching duties in first cycle Programs of study by decision of the competent body of the MSc. PSs shall issue an academic identity card through the Electronic Service for Acquiring Academic Identity of the Ministry of Education and Religious Affairs.

8.3. Postgraduate Student Deregistration

The deregistration of a PS is made after a relevant recommendation of the CC of the MSc to the DA and a relevant decision is taken. The decision shall be notified within 15 days to the PS concerned, and he/she shall have the right to submit an appeal within fifteen (15) days from the date of its issuance. The appeal shall be finally decided by the above-mentioned bodies.

The DA, following the recommendation of the CC, may decide to delete a PS on the following grounds:

1. Faulty fulfillment of the obligations of the PS, as described in the Internal Regulations of the UNIWA.
2. Failure to pay the prescribed tuition fees (in any case, a student who has not met his/her financial obligations is not entitled to receive either a certificate of completion of studies or the MSc).
3. Disciplinary misconduct, such as violation of academic ethics and, in general, any violation of the applicable legislation and the Internal Regulations of the UNIWA.
4. Request for deletion of the PS himself.
5. Has repeatedly failed the examination of a course or courses as specified in the Internal Regulations.
6. Has not renewed his enrollment or has not attended classes for two (2) consecutive semesters.
7. Has committed the offence of plagiarism or an offence falling under the law on intellectual property (Law 2121/1993).
8. For any other reason deemed necessary.

In case of permanent discontinuation of studies or deregistration of a PS for any reason, the fees already paid will not be refunded.

Article 9

Tuition fees - Scholarships - Tuition fee Waiver

The amount of the tuition fees for the MSc is 4,800 euros.

The students are obliged to pay the tuition fees. The amount of the prescribed tuition fees for the entire Program is specified in the Government Gazette establishing the MSc.

In cases of interruption of studies, the total amount paid is non-refundable.

Tuition fees are paid to the Special Account for Research Funds of the UNIWA, which is responsible for their management.

PSs must have settled all their financial obligations before a certificate of completion of studies and the award of the MSc is granted PSs may be awarded scholarships and prizes for excellence as follows:

The MSc may provide a number of scholarships (tuition fee waiver) to full-time students, following a decision of the CC and a decision of the DA, in which the amount of the scholarships, the supporting documents, the conditions and the procedure for granting scholarships, as well as the obligations and rights of the scholarship holders are specified.

Scholarships shall be included in the approved budget of the MSc and shall be granted for socio-economic reasons. The percentage of scholarships, the conditions of award, the obligations and rights of the scholarship holders, as well as the income criteria are defined by the legislation in force (Article 86 of Law 4957/2022) as follows:

1. Registered students of the MSc may attend the MSc free of charge if they meet the financial or social criteria set forth herein. A prerequisite for the granting of the right to free attendance due to financial or social criteria is the fulfilment of excellence requirements during the first cycle of studies, which corresponds at least to the possession of a grade equal to or higher than seven and a half with an excellent grade out of ten, if the evaluation of the basic degree presented for admission to the MSc has been carried out according to the ten-point evaluation scale of domestic universities, otherwise this criterion is applied proportionally according to the respective evaluation scale, provided that the degree presented has been granted by a foreign Institution.
2. The total number of students attending free of charge may not exceed the number corresponding to thirty percent (30%) of the total number of enrolled students per academic year. If, when calculating the number of beneficiaries of exemption from tuition fees, a decimal number is obtained, the number shall be rounded to the nearest whole number. If the number of beneficiaries of the exemption exceeds this percentage, the beneficiaries shall be selected in descending order until the number is reached.
3. The submission of applications for free tuitions per MSc in accordance with this regulation shall take place after the completion of the admission process of students to the MSc.
4. The right to free attendance is granted to the PS who fulfils the condition of par. 1, provided that the following criteria apply:
 - 1) the average of the sum of the taxable incomes of the last two (2) financial years of all the family members of the applicant for exemption from tuition fees, namely the applicant himself/herself, his/her parents, regardless of whether they file a joint or separate tax return, and his/her siblings up to twenty-six (26) years of age, if they are unmarried and have the same taxable income within the meaning of Article 7 of Law no. 4172/2013 (A' 167), does not exceed seventy percent (70%) of the national median disposable equivalent income, according to the most recently published data of the Hellenic Statistical Authority (ELSTAT), if the applicant has not reached the age of twenty-six (26) and is unmarried or has not entered into a cohabitation agreement,
 - 2) the average of the applicant's personal taxable income for the last two (2) financial years does not exceed one hundred percent (100%) of the national

median disposable income equivalent, according to the most recently published data of ELSTAT, if the applicant has reached the age of 26,

3) the average of the sum of the taxable income of the last two (2) financial years of the applicant for exemption from tuition fees and his or her spouse or cohabiting partner, if married or cohabiting, regardless of whether they file a joint or separate tax return, does not exceed one hundred percent (100%) of the national median disposable equivalent income, according to the most recently published data of the National Statistical Office.

5. If the applicant for the exemption has not reached the age of 26 and is a child of a family with three or many children or a child of an unmarried parent or an orphan of at least one (1) parent or a person with a disability or a member of a household with a person with a disability, he may apply for the exemption by half (50%) of the obligation to pay tuition fees, as long as the average in par. a) of par. 4 exceeds seventy percent (70%) and does not exceed one hundred percent (100%) of the national median equivalent disposable income.
6. The examination of the criteria for exemption from tuition fees is carried out by the DA respectively and a reasoned decision is issued on the acceptance or rejection of the application.
7. The possibility of exemption from the obligation to pay tuition fees is provided exclusively for studying at one (1) MSc organized by a national Higher Educational University.
8. All the above do not apply to citizens of third countries.

The CC evaluates and ranks the nominations based on the criteria defined in this Internal Regulation of Operation of the MSc and recommends the list of names of the candidates to the Assembly.

In case of waiting for tuition fee waiver, the applicant pays tuition fees until the notification of the scholarship award decision. After notification of the decision, if the applicant is entitled to a waiver, the amount paid will be refunded in full. This exemption is granted for participation in only one MSc. The total number of PFs attending free of charge may not exceed the number corresponding to thirty percent (30%) of the total number of registered students per academic year. If the numerical calculation of the number of beneficiaries eligible for exemption from tuition fees results in a decimal number, it shall be rounded to the nearest whole number. If the number of beneficiaries of the exemption exceeds this percentage, the beneficiaries shall be selected in descending order until the number is reached.

A ministerial decision shall define each relevant matter and establish per year the amount corresponding to the national median disposable equivalent income (the individual and seventy percent (70%) of the family income) according to ELSTAT data.

Article 10

Master's Degree (MSc Award Certificate-MScAC)

The MScAC is a public document. The graduate of the MSc may be granted, before the award, a certificate of successful completion of the MSc and an Academic Transcript with the corresponding credit points (ECTS).

A Diploma Supplement is attached to the MSc, which is an explanatory document and is not a substitute for the official title of study or the detailed course evaluation. The Diploma Supplement shall be attached to the MScAC and shall provide information on the nature, level, general context, content and status of the studies successfully completed by the person named on the original of the diploma. The Annex does not make any evaluative judgements and there are no statements of equivalence or equivalence or proposals for the recognition of the MSc abroad. The Diploma Supplement is issued automatically and without any financial charge in Greek and in English, and must meet the authenticity requirements for the degree awarded. The date of issue of the Diploma Supplement does not necessarily coincide with the date of award of the MSc, but can never be earlier than that date.

$$B = \frac{B_1 \cdot \Pi_1 + B_2 \cdot \Pi_2 + \dots + B_v \cdot \Pi_v}{\Pi_1 + \Pi_2 + \dots + \Pi_v}$$

where B₁,B₂....B_v are the grades of all courses that the MF has successfully taken and B₁,B₂....B_v are the credit units corresponding to each course.

Upgradable grades are five (5) and higher. The rating scale for evaluating the performance of the PSs is defined from zero (0) to ten (10) as follows:

- **Excellent:** from eight and fifty (8.50) to ten (10),
- **Very Good:** from six and fifty (6.50) to eight and forty-nine (8.49),
- **Well:** from five (5) to six and forty-nine (6.49) or
- **It is rejected:** from zero (0) to four and ninety-nine (4.99).

Article 11

Academic Advisor

One faculty member is appointed by the DA, following a proposal from the CC, as an academic advisor for each PS. The academic advisor monitors the progress of the PS, provides specific information about the MSc and the correlation of the studies with his/her scientific background and perspective, discusses with the PS his/her future

plans for his/her academic and professional development, advises him/her on the improvement of his/her work in relation to the requirements of the Department, on the use of the University's resources and infrastructure and, in general, on academic, organizational or administrative issues and may recommend issues concerning the PS to the CC.

The academic advisor does not necessarily undertake the supervision of the MScTh or Internship of the PS.

The academic advisor is responsible for the management of the complaints - objections of the PS, which he/she forwards to the Director of the MSc for settlement - resolution of the problem by the CC.

Article 12

Plagiarism

The PS is required to indicate appropriately whether he/she has used the work and opinions of others. In addition, PS who have used the services and assistance of Artificial Intelligence (AI) for the preparation of work assigned to them in the context of the MSc and/or MSc, should include in the preamble of the text a "Statement on the use of generative AI and AI-assisted technologies in the writing process", where they will state which tool they used and for what purpose.

Plagiarism is considered a serious academic offense. Plagiarism is considered to be copying someone else's work, as well as using someone else's work, published or not, without proper attribution. Copying any documentary material, even from the candidate's studies, without reference, may constitute grounds for a decision by the Board of Trustees to expel the candidate. In the above cases, the selection board may decide to remove the candidate from the list, after allowing him/her to express his/her views on the matter orally or in writing.

Any misconduct or breach of academic ethics shall be referred to the CC to address the problem. Misconduct shall also include misconduct in the form of copying or plagiarism and, more generally, any breach of the provisions on intellectual property rights by an academic staff member when writing coursework or preparing the Master's thesis.

Article 13

Awarding of degrees - oaths

The PS who has successfully completed his/her postgraduate studies is sworn in at a public swearing-in ceremony, before the Rector or the Vice Rector as the representative of the Rector and the President of the Department, which takes place

after the end of each examination period, at a date and time determined by the Rector in collaboration with the Presidents of the Departments. The oath is not a component of successful completion of studies, but it is a necessary condition for the award of the degree. For reasons of force majeure (e.g. health reasons, residence or work abroad, military obligations) and with a request to the Secretariat of his/her Department, the graduate may request the award of the degree without participating in the swearing-in ceremony or request to participate in a subsequent swearing-in ceremony. Exemption from the requirement to attend a swearing-in ceremony shall be approved by the Chair of the Department. Prior to the swearing-in ceremony or exemption from it, graduates may be given a certificate of successful completion of their studies.

A degree awarded may be revoked or canceled if it is shown that the legal and institutional conditions for its award did not exist at the time it was awarded. The revocation or annulment is made following a decision of the DA, which is communicated to the Rector of the institution.

Article 14

Other Provisions

Any matter that arises in the future that is not covered by the relevant legislation or this Regulation, will be dealt with by decisions of the competent bodies and where necessary by amending the Regulation.

ANNEX

Organization of distance learning

The organization of the educational process of the MSc Program "Sustainable Energy Systems" may also be carried out using distance learning methods. The teaching of the courses may be partly carried out by distance education methods, following the mixed system of education, where the educational process is carried out by combining distance education with face-to-face education, in accordance with Article 88 of Law 4957/2022, Ministerial Decision no. 18137/Z1, Government Gazette 1079/28-2-2023 and Article 9 of the Standard Regulation of the operation of the MSc of the PADA (Government Gazette 4861/2-8-2023). The distance teaching of the courses of the MSc can be set up to 80% as provided by the relevant legislation.

In addition, the examinations and public support of the Postgraduate Diploma Theses may be conducted in person or remotely within the framework of the MSc, in accordance with the relevant legislation. Distance examinations shall be conducted in accordance with the guidelines and rules of the Institution in a manner that ensures the integrity of the procedure and the protection of students' personal data and after the students have declared their acceptance of the conditions of the examination.

For distance education, the modern digital platforms (e.g. e-class, Moodle, MS Teams, etc.) of the UNIWA are used, which include modern and asynchronous digital classrooms and tools. The UNIWA, the Department of Mechanical Engineering and the MSc have the appropriate technical infrastructure of modern and asynchronous tele-education (laptops, webcams, etc.) and software to meet the educational needs of postgraduate students. Microsoft Teams is used for modern distance education with parallel support from the educational platforms e-class and Moodle.

Each MSc PS receives a single password for all e-learning services upon enrolment in the Program. The single password refers to the username and password. The MSc Secretariat, in accordance with the procedures of the University and the Network Support Department, takes care of issuing these personal passwords, which are sent to the students. For security reasons, the passwords are secret and strictly personal for each user.

All course material may be offered digitally, including texts, slides, graphs, charts, graphics, photographs, videos, diagrams, illustrations, simulations and generally all kinds of files. This educational material is subject to copyright and is governed by national and international copyright provisions, with the exception of the expressly recognized rights of third parties.

It is expressly forbidden to record, videotape, audio record, in any way whatsoever, as well as to reproduce, republish, copy, transmit, publish, translate, modify the material of the courses conducted at a distance, in part or in summary, without the express prior written consent of the instructor. In case of violation of the above prohibition, criminal prosecution and the procedure for the imposition of all legal sanctions and claims will be initiated immediately, in accordance with the provisions on Intellectual Property. The above excludes the simple monitoring and "downloading" of the learning material for strictly personal use of the students for study, exercises/assignments and MScTh.

In case the instructor intends to video record an electronic lecture or other modern educational activity (practical exercises, laboratory group), before the recording starts, the participants of the PSs are informed so that they can consent or even have the possibility to deactivate the camera, their microphone or even leave the meeting.

All personal data in electronic format shall be stored on the servers of the UNIWA or its external contractors. All processing operations are carried out following Commission Decision (EU, Euratom) 2017/46 on the security of the European Commission's communication and information systems.

The external partners are bound, in respect of each processing operation of your data on behalf of UNIWA, by a specific contractual clause as well as by the confidentiality obligations resulting from the transposition of the General Data Protection Regulation into the law of the EU Member States (General Data Protection Regulation, Regulation (EU) 2016/679).

To protect personal data, UNIWA implements a series of technical and organizational measures. The technical measures shall include appropriate actions to address cyber security, the risk of data loss, data corruption or unauthorized access, taking into account the risk involved in the processing and the nature of the personal data processed. The organizational measures shall, inter alia, restrict access to personal data to authorized persons only, who must by law have knowledge of them in order to carry out the processing.

Access to personal data shall be granted to UNIWA staff responsible for carrying out the processing by the 'need to know' principle. Such staff shall be bound by legal obligations and, if necessary, by additional confidentiality agreements. Access to personal data is also granted to the staff of external partners in charge of testing web services on behalf of the UNIWA. The data collected shall not be disclosed to third parties except to the extent and for the purpose that may be required by law.

For the technical support, maintenance and upgrading of the distance education infrastructure, the UNIWA operates the Software Support and Development Department, the Network Support Department, the Technical Support and Equipment Maintenance Department- Help Desk.