Doc. 300.1.2

Date: 26/03/2025

Higher Education Institution's Response

- **Higher Education Institution:**
  University of Cyprus
- **Town: Nicosia**
- **Programme of study**
  Name (Duration, ECTS, Cycle)

  In Greek:

  Μεταπτυχιακό Πρόγραμμα «Ενεργειακές Τεχνολογίες και Αειφόρος Σχεδιασμός» (ΕΤΑΣ) (MEng 3-8 Εξάμηνα/ 90 ECTS & MSc 3-8 Εξάμηνα / 96 ECTS, συμβατικό, Διατμηματικό)

  In English:

  Master in Energy Technologies and Sustainable Design (MEng 3-8 Semesters/ 90 ECTS & MSc 3-8 Semesters / 96 ECTS, Conventional, Interdepartmental)
- **Language(s) of instruction:** Greek and English
- **Programme's status:** Currently Operating
- **Concentrations (if any):**

  In Greek: Concentrations
  In English: Concentrations

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The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the "Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws" of 2015 to 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Guidelines on content and structure of the report

- *The Higher Education Institution (HEI) based on the External Evaluation Committee's (EEC's) evaluation report (Doc.300.1.1 or 300.1.1/1 or 300.1.1/2 or 300.1.1/3 or 300.1.1/4) must justify whether actions have been taken in improving the quality of the programme of study in each assessment area. The answers' documentation should be brief and accurate and supported by the relevant documentation. Referral to annexes should be made only when necessary.*

- *In particular, under each assessment area and by using the 2nd column of each table, the HEI must respond on the following:*

    - *the areas of improvement and recommendations of the EEC*
    - *the conclusions and final remarks noted by the EEC*

- *The institution should respond to the EEC comments, in the designated area next each comment. The comments of the EEC should be copied from the EEC report **without any interference** in the content.*

- *In case of annexes, those should be attached and sent on separate document(s). Each document should be in *.pdf format and named as annex1, annex2, etc.*

1. Study programme and study programme's design and development
(ESG 1.1, 1.2, 1.7, 1.8, 1.9)

Strengths

The programme may boast a number of strengths embedded in its pedagogical structure and that manifest themselves in terms of good teaching practices, research achievements and contributions to real world innovative solutions.

The main strength of the programme is its multi-disciplinarity. All four Departments of the Faculty of Engineering come together to form a programme on Energy, one of the main issues of modern society. The students acquire a more general exposure to the various aspects relevant to energy, production, distribution and use than would be possible by a single Department. The practical capstone projects teach them also how to appreciate complementary expertise and how to work effectively in collaboration with fellow engineers of other disciplines to tackle complex problems.

An additional strength is the availability of excellent opportunities for high level Master's thesis production taking advantage of the varying abilities and research infrastructures of the faculty members of the College of Engineering and the research centres involved in the programme.

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
It is very important to enhance the program further with more electives in key areas, especially those of other renewable energy sources, such as bioenergy and geothermal energy, as well as in the areas of sustainability assessment and circular economy. This can be accomplished with additional faculty hirings either in permanent jobs or at least as visiting faculty members.	This is not about a new course being offered but about cancelling a recommendation to reduce the number of constrained elective courses offered by the contributing departments by one course (ARCH 549, ECE 685, ECE 686 and MME 508. This recommendation has been remanded, and the number of courses offered by each department participating in the degree program remains the same as before The Academic Committee discussed, on 25/02/2025, the reinstatement of the elective course CEE 580 "Dynamics of the Atmosphere and Air Pollution Dispersion" (course description – annex 1).	Choose level of compliance:
There is very little feedback and involvement from stakeholders, such as industry, professional bodies, local government etc. in revising the programme. It is suggested to form an advisory board that includes stakeholders and to consult it on a regular basis.	With regards to feedback from stakeholders this will further be enhanced through joint stakeholder and student / faculty engagement in real life projects as part of case studies in the program's curricula and with feedback from the stakeholders. Additionally, students engaged with stakeholders through the course POL 700. On January 31st, 2025, they met with members of the Parliamentary Committee on Energy, Trade, Industry, and Tourism, to discuss the country's energy strategic plan. On February 28th, 2025, they visited the construction site of the new square	Choose level of compliance:

	in Nicosia. The program is also planning three more visits/lectures for the current semester.	
It is also very important to publicise the programme properly by keeping the programme web page updated and by advertising it via social media and other publications in the effort to attract more international students. This will help increase the number of students and ensure a better up-to-date programme of study.	The program's site is being updated. https://etsd.ucy.ac.cy/en/ . Also a new program promotion campaign is underway for the coming announcement of spots to the program that involves an updated and enhanced website per the committee's recommendations. It is expected that the transition to teach the program in the English language will further augment the number of foreign applicants to the program. The program has also developed new promotional study guides and is preparing new materials for enhancing its presence on social media platforms and educational platforms for the next application cycle (annex 2).	Choose level of compliance:
It is important to keep track of the employment of alumni for the programme and to advertise it properly.	Last in this section, an effort is being made to coordinate with the administration of the respective departments the following up of the program's graduates. At this stage, the program has progressed in creating a form (annex 3) for recording alumni, as well as incorporating the ability for mentoring. This practice is to begin on the next graduation cycle this spring semester 2025. Additionally, the course POL 700 "Engagement with practice and industry" now includes the offering of lectures by alumni of the program. Since 2021 the alumni survey has been carried out by the national graduate tracking mechanism. For more information, please visit the official site: https://skilltracking.highereducation.ac.cy/the-project/national-graduate-tracking-mechanism/	Choose level of compliance:

2. Student – centred learning, teaching and assessment

(ESG 1.3)

Strengths

A list of strengths, such as examples of good practices, achievements, innovative solutions , may be seen below.

- Overall, the programme is characterized by a good balance and combination of theoretical and practical studies on the various topics.
- The staff is devoted and of high scientific standards.
- In general, the support of the students for individual and social development is good.
- The number of students per teacher, although varying from year to year, is adequate.
- Capstone project is a hands-on project and can be considered as an asset of this programme, as it allows application of the theoretical knowledge obtained from the courses in a real-life setting, and at the same time it prepares students for working in multidisciplinary teams as is usually done in engineering projects.
- The way that students' feedback is collected is very informative and is used to constantly reevaluate the programs performance.

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
The capstone project preparation of the students should be accompanied by a structured schedule of lectures/seminars; such seminars should start with the presentation in a detailed way of all the steps and the peculiarities of this collaborative project including the assessment and the peer marking scheme, and then, about the forms and the individual parts of a project (Introduction, Aim, Objectives, Research Questions to be addressed, Methodology to be developed, Case studies or Examples, Conclusions, Literature review etc). Additional seminars could be given by visiting scientists from industry or academia on related research topics. Such lectures and visiting lecturers' seminars should be delivered e.g. every 2 weeks.	With regards to the capstone project, a revised syllabi have been agreed upon with the instructional team regarding all aspects suggested by the committee and including a revision (within a year and a half) of the software utilized to Rhino with the Lady Bug plugin. The topics have also been revised to move back to a single building appropriate in complexity to the task at hand or in case of multiple buildings, to screen them for compatibility and comparability. The assessment methods have also been revised to include components of individual assessment, which even though is not the peer assessment as defined by the committee, it is very close to its spirit in terms of both collective and individual assessment of capstone team members. We intend to keep a close eye on assignments using the tools	Choose level of compliance:

The topics of the capstone projects should be fully ready with guidelines and should be advertised the very first day of the respective semester that the project starts. They should be also developed in collaboration of the lecturers with the stakeholders (in particular with industry). Assessment of the capstone projects is recommended to follow a very clear marking scheme, i.e. the exact contribution of different students to the various parts/components of the project. A significant part (e.g. 20-25%) of the mark could be given by each participating student to his/her mates within each project (peer marking) following a clearly defined peer assessment marking scheme. In addition, the assessment criteria (marking) for these components have to be defined in full details. Still the intended learning outcomes for certain individual courses need further clarification. All assignments should first pass TURNITIN before final submission, and the respective similarity percentage should be clearly presented in the beginning of the submitted assignments. Repeatable chapters have been spotted in the	and platforms provided by our university to avoid similarity and keep well within the suggested percentages suggested by the committee. The course syllabi are under periodical scrutiny to avoid repetition of topics, even though the program's management committee also sees no wrong in similar topics being presented through the unique lenses of the individual departments participating in this programming, as this may present a more spherical and holistic view of key issues included in the coursework. You can find the updated syllabi in annex 4. Life Cycle Analysis and Circular Economy concepts are already included as part of the structure of at least two courses ARCH 538 & ARCH 549- annex 1) and discussion is ongoing as to the possibility and / or interest in offering courses specifically oriented towards these two (and others) topics. Assignment submission timelines are spelled out in each course syllabus, while connections to the industry and / or secondments will be explored further through two courses dealing with this aspect of practical and professional exposure and training, though the program but also through institutional frameworks connecting academia to practice, as suggested in the Section 01 and also in Section 03.	

educational material, whilst students mentioned that some topics are repeated. Therefore it is suggested all Syllabi be scrutinised to avoid repetitions. At least one more Elective course per Discipline (Architecture, Civil, Mechanical and Electrical Engineering) should be added to the list of elective courses.		

3. Teaching staff

(ESG 1.5)

Strengths

A list of strengths, such as examples of good practices, achievements, innovative solutions, may be found below.

- The teaching staff is highly qualified, bringing interdisciplinary expertise to the programme.
- Strong research activity among faculty members enriches the academic rigor and relevance of the curriculum.
- Collaboration across disciplines fosters innovative teaching and comprehensive learning experiences.

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
Strengthen professional development opportunities for teaching staff, focusing on innovative teaching methodologies and the use of modern educational technologies. Try to hire faculty that can cover a wider spectrum of topics, especially the important missing ones mentioned elsewhere. Increase efforts to recruit more international faculty and visiting scholars to enhance	Development opportunities for staff are already in place at the institutional level and an effort is being made to foster faculty development in the program itself and in the topics it delves upon. The Centre for Teaching and Learning (CTL) aims to support and develop teaching and learning so that these may correspond to modern needs and internationally compatible and competitive quality criteria. As part of its mission to promote and sustain the quality of teaching and learning at	Choose level of compliance:

diversity and global perspectives. Strengthen the involvement of industrial partners and international institutions to create impactful projects and enhance the programme's relevance. Develop a strategy to use research findings as a foundation to continuously update course content.	UCY, the CTL develops relevant mechanisms and policies for the quality assurance in these fields. Further, it organises a wide range of activities, such as seminars, training sessions, and lectures, in order to: support the Departments and academic staff on matters relating to teaching and, learning. It is worth mentioning that the last workshop organised by the CTL on February 26th was about *AI in Academia: Best practices for integrating AI tools in teaching and for evaluating AI-assisted student coursework.* In addition, the University subscribes Microsoft 365 as an instructional and administrative platform (including its AI components) and consequently all instructors are versed in its operation. Also the university use blackboard and BannerWeb platforms among others. Both instructor and students have the opportunity to be trained on the use of specific software utilized in the courses offered in the program. Instruction also occurs directly by the software vendors. Examples such as those used for the capstone project include Rhino and its plugin Lady Bug Through the capstone design project, the program gets involved with industrial partners such as (hotels, ministry of education, municipalities, ministry of	

	transport, communications and works, ect) In terms of recruiting staff this is limited or allowed only to the extent that these positions become available by the state. In the meantime, however, exchange opportunities through Erasmus and YUFE and revisited to allow for the internationalization of the program, its faculty and its students. The previous point also delves upon the participation of staff and students in national and international research and consultancy projects which goes a long way in enhancing and broadening the participants' toolsets, feeding back into the curriculum and leading to updated and current course content.	

4. Student admission, progression, recognition and certification *(ESG 1.4)*

Strengths

A list of strengths, such as examples of good practices, achievements, innovative solutions , may be found below.

- Each student once admitted to the program, s/he is appointed to an Academic Advisor.
- Due to the fact that the programme is interdepartmental having a rather low number of students per year, the student is given the advantage of utilising the low student-faculty ratio and the chance to move and collect data within all four departments.
- The online platforms of Online Banner Web and Online Blackboard System is a helpful tool during studies to check data and form the curriculum path.
- Overall there is support of appropriate high level by the staff of the programme to the students.

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
The interdepartmental format of the programme, and the departmental split among the four departments, needs from the very first week to be more clear to the students. This is	A first meeting has already taken place on January 15th, 2025, with existing and new students and has been structured into the advising and feedback loops of the program with the administrative arms of the individual departments	Choose level of compliance:

because, sometimes, the scheme confuses the students when they seek assistance or information directly from the departments, instead of contacting the interdepartmental administrator. Despite the fact that the interdepartmental administrator (1 person) is part-time (25%) employed, as the programme has a low number of students, communication with and support of students seems to be efficiently performed with the current workload. However, as now with the delivery of all courses in English the number of students is expected to be significantly increased, it is recommended that the interdepartmental administrator (being a key person in the everyday delivery of the programme) should be at least 50% with a permanent contract to strongly enhance the resilience of the programme and the moderation of any future administrative and coordination risks.	being now in closer contact with the programs own administrative support, at the beginning and end of each semester. Furthermore, it is our aspiration of all involved in the program that as it transforms into a truly international program taught in English its success will allow the program to solicit further administrative and technical support from the School of Engineering and the University resources and reach the 50% goal recommended by the evaluation committee.	

5. Learning resources and student support

(ESG 1.6)

Strengths

A list of strengths, such as examples of good practices, achievements, innovative solutions, may be found below.

- The programme benefits from state-of-the-art facilities, including access to research Centres of Excellence.

- The programme appears to have sufficient flexibility to adjust its resources to accommodate fluctuations in student numbers, but this is not explicitly detailed in the documents provided.
- In the short term, three of the four departments participating in the programme will find space in the new campus buildings. This will help increase interdisciplinary exchange and interaction between teachers and students.
- Students have access to licensed software and digital tools necessary for their coursework and research.
- Physical resources, including premises, libraries, study facilities, and IT infrastructure are adequate to support the study programme.
- Laboratories are well-equipped to support interdisciplinary learning, practical training, and research synergies.
- The programme has a dedicated administrative team that ensures smooth operations and supports students in day-to-day activities.
- Students are assigned academic advisors who provide guidance on academic matters.
- Students are looked after appropriately also thanks to the currently limited number.

Areas of improvement and recommendations **by EEC**	Actions Taken by the Institution	For Official Use ONLY
Regularly evaluate the adequacy and accessibility of resources. Ensure that students are trained in the use of available software and tools to maximise their benefit. Enhance accessibility features for students with special needs or physical limitations. Monitor student feedback on the adequacy of physical resources and make adjustments as necessary. Strengthen counselling and mentorship services to address the diverse needs of students, including career guidance and personal support. Provide training for administrative staff to enable a good support of handling international student needs.	Per the committee's recommendations, the interdepartmental management committee with the support of the individual departments has already initiated advising and feedback loops for existing and new students admitted to the program starting this semester to: • Evaluate adequacy and accessibility of resources • Support software and hardware training to all of the tools used in the program • Strengthen counseling and mentoring with the program and in practice • Continually update the program's website and its media presence • Try and secure dedicated admin and IT support resources • To enhance and expand existing professional recruitment initiatives . . . and in general – given the above – to try to increase the	Choose level of compliance:

Improve WEB page of the programme with information and services available for students. Expand career support services to align better with global job market trends and employer expectations. Strengthen initiatives for international student support, including tailored orientation programmes and ongoing academic assistance. Increase the level of financial autonomy of the programme by allowing the programme committee to dispense a higher percentage of the income to expenses relevant to the programme. Make student fellowships available as in other programmes as was the case in the past. Secure devoted IT staff to support the programme.	program's solvency, autonomy and identity. Information about available services is available on the program's site: https://etsd.ucy.ac.cy/en/useful-information/ Also, the university's Center of Entrepreneurship supports students, young researchers, academics, administrative staff and graduates. Its mission is to promote a culture of entrepreneurship throughout the university community, establish high-quality services and interfaces for the transfer of scientific innovations and new ideas to the global market as well as contribute to the development of an innovative business ecosystem in Cyprus through the utilization of research results, infrastructure and know-how of the University of Cyprus in order to compete in the international business environment. Student support mechanisms exist both at the Department level and centrally through the Academic Affairs and Student Welfare Service (AASWS). At the Department level, the University of Cyprus has adopted the institution of the Academic Advisor. An Academic Advisor is a member of the Department's faculty and is appointed for each student. The advisor follows - up the students' academic progress and guides them, particularly in connection with any problems faced in their academic performance. In addition, all	

	academics set weekly office hours when meetings are arranged with the students regarding matters relating to their studies. Moreover, through the electronic BannerWeb system, students receive feedback on their projects and examinations, as well as other information concerning the content of the courses, reading materials etc. In addition to academic and research support offered can help students explore options offered by the University's Erasmus office for a exchanges or placements. The program does not have dedicated IT support but shares in that provided to the school of engineering which consists of four IT specialists.	

B. Conclusions and final remarks

Conclusions and final remarks **by EEC**	Actions Taken by the Institution	For Official Use ONLY
The interdisciplinary programme brings together all Engineering Departments collaborating to provide significant education opportunities on energy-related issues in a unique way, promoting hands-on real-life problem solving in an integrated manner. The human resources and the available infrastructure may indeed support high-level education and research activities. It is very positive that the language of instruction has been converted into English alone and the various Departments are in the	The interdepartmental program management committee would like to thank once again the extremal valuable recommendations imparted by the visiting evaluation committee and hopes that its responses to its suggestions are satisfactory so that along with a well thought publication campaign and continuous updating of the study program, the relevant stakeholders' input, the staff and students' feedback and also cognizant of international trends, may be successful in augmenting the program's profile and to render even more competitive at an international scale.	Choose level of compliance:

process of moving to the same campus. These, along with a well thought publication campaign and continuous updating of the study programme, taking into account stakeholders' input, students feedback and international trends may help upgrade the programme to a very competitive one at an international scale.		

C. Higher Education Institution academic representatives

Name	*Position*	*Signature*
Andreas Savvides	Associate Professor, Coordinator	
Stavros Kassinos	Professor, Member of the Academic Committee	
Mathaios Panteli	Assistant Professor, Member of the Academic Committee	
Demetris Stagonas	Assistant Professor, Member of the Academic Committee	

Date: 26/03/2025

ANNEX 1 – COURSE DESCRIPTION

Course Title	**Dynamics of the Atmosphere and Air Pollution Dispersion**				
Course Code	CEE 580				
Course Type	Elective				
Level	Postgraduate				
Year / Semester	1st/ Spring Semester				
Teacher's Name	Professor Marina Neophytou				
ECTS	8	**Lectures / week**	3	**Laboratories / week**	
Course Purpose and Objectives	The course aims to develop a fundamental understanding of air pollution dispersion particularly in the urban atmosphere and enable students to apply the fluid mechanical principles both in research and operational contexts. The course will cover: sources, sinks and receptors of air pollution, causes and consequences, meteorology and climatology, density-stratified fluid mechanics, internal waves, flow over topography, air quality, atmospheric chemistry, turbulence, turbulent flows including reacting flows, turbulence modelling.				
Learning Outcomes	• Fundamental understanding of atmospheric dynamics and its role in air pollution dispersion, particularly considering the urban environment • Build skills in critical application of atmospheric dynamics in the dispersion of air pollution - both in the research and operational context.				
Prerequisites	Fluid mechanics (CEE270) Transport Phenomena in Environmental Engineering (CEE483)	**Required**			
Course Content	1. Introduction to Meteorology and Air Pollution 2. Atmosphere Structure 3. Meteorological phenomena as events of Atmospheric Dynamics: weather- climate change, wind, tornado, precipitation, hurricanes, dust phenomena, El Nino 4. Turbulent flows 5. Atmospheric chemistry 6. Jets and overflows in the atmosphere 7. Research and operational models for the simulation of air pollution dispersion				

Teaching Methodology	Lectures
Bibliography	Teachers' notes. STULL, R., METEOROLOGY FOR SCIENTISTS AND ENGINEERS (Brookes/Cole) Second Edition CSANADY, G.T.,, TURBULENT DIFFUSION IN THE ENVIRONMENT TURNER, J.S.,BUOYANCY EFFECTS IN FLUIDS C.U.P. 1973 TENNEKES, H. & LUMLEY, J. L , A FIRST COURSE IN TURBULENCE MIT Press 1972
Assessment	Homework, Final exam.
Language	English

Course Title	**ENVIRONMENTAL BUILDING DESIGN**				
Course Code	**ARH 538**				
Course Type	**Mandatory**				
Level	Postgraduate				
Year / Semester	1st/ Spring Semester				
Teacher's Name	Aimilos Michael				
ECTS	8	**Lectures / week**	1 (3hours)	**Laboratories / week**	
Course Purpose and Objectives	This course aims to deepen the theoretical and applied knowledge of students in the object of Environmental Design of Buildings and highlight the role of architectural design, construction, and appropriate technical support in ensuring proper living conditions, minimizing energy consumption, and reducing adverse environmental impacts. Aims to the development of criteria for the utilization of appropriate strategies (bioclimatic, energy planning and ecological building), with the aim of creating a holistic perception in the environmental design approach.				
Learning Outcomes	The environmental aspect of architectural design constitutes a broad and multifaceted field of research addressing the areas of bioclimatic design, energy in architecture and construction. The bioclimatic design refers to the optimization of indoor comfort and as part of the design process, significantly defines form and construction of the architectural design. The integration of an environmental approach in architectural design-associated with both indoor environment quality				

	and energy performance of the building envelope-constitutes a significant aspect of the course.		
Prerequisites	-	**Required**	-
Course Content	The course covers issues of Bioclimatic Architecture concerning the improvement of total comfort conditions of users – thermal, visual, acoustic comfort, air quality – in the indoor built environment, issues of energy design referring to the minimization of energy consumption of the building envelope (thermal insulation, appropriate technical support systems, monitoring, and energy management systems of buildings) as well as issues of ecological construction regarding the minimization of the ecological footprint (recycling, reuse, embodied energy and CO2 emissions).		
Teaching Methodology	Lectures/Lab		
Bibliography	**Book:** - Energy Manual: Sustainable Architecture (Construction Manuals) Manfred Hegger, Matthias Fuchs, Thomas Stark , Martin Zeumer, editor DETAIL **Bibliography:** - Αμανατίδης Α., Τζήκας Κ., Ποιότητα αέρα και θερμική άνεση σε εκπαιδευτικά κτίρια. Διπλωματική εργασία, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Θεσσαλονίκη, 2002. - Αξαρλή - Αντωνίου Κ., Ο ενεργειακός σχεδιασμός του κελύφους και η αξιοποίηση του απευθείας κέρδους στα σχολικά κτίρια, Καθοριστικές παράμετροι για τον ελληνικό χώρο. Διδακτορική Διατριβή, Τμήμα Πολιτικών Μηχανικών, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Θεσσαλονίκη, 1995. - Ευαγγελινός Ε., Κοντορούπης Γ., Μαΐστρου Ε., Διερεύνηση μεθόδων θέρμανσης με ηλιακή ενέργεια: Πρόταση εφαρμογής σε σχολικά κτίρια. Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα, 1978. - Ευαγγελινός Ε., Ζαχαρόπουλος Η., Στοιχεία βιοκλιματικού σχεδιασμού. Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα, 2009. - ΚΑΠΕ, Οδηγίες για Θερμική - Οπτική Άνεση και Εξοικονόμηση Ενέργειας σε Δημόσια Σχολεία. Κέντρο Ανανεώσιμων Πηγών Ενέργειας, Αθήνα, 2002. - Κλίμα της Κύπρου. Μετεωρολογική υπηρεσία, Υπουργείο Γεωργίας και Φυσικών Πόρων, Κυπριακή Δημοκρατία, Λευκωσία, 1986. - Κοντορούπης Γ.Μ., Δίκτυα και Εγκαταστάσεις Τεχνικής Υποδομής Κτιρίων και Πόλεων. Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα, 1999. - Κοντορούπης Γ.Μ., Ενεργειακός – Βιοκλιματικός σχεδιασμός κτιρίων και οικισμών. Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα, 2001. - Κορωναίος Α., Πουλάκος Γ., Τεχνικά Υλικά, τόμος 2, Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα , 2005. - Κυμπρίτη Α., Θόρυβος και Περιβάλλον Εργασίας. Πανεπιστήμιο Πειραιώς, Αθήνα, 2007. - Μιχαήλ Α., Αρχιτέκτονας Νεοπτόλεμος Μιχαηλίδης, η βιοκλιματική διάσταση στο έργο του. Εθνικό Μετσόβιο Πολυτεχνείο, Αθήνα, 2003.		

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Assessment	• Course attendance and participation [individual grade] 20% • Midterm presentations [individual grade] 30% • Final presentation and design based research project submission [individual grade] 50%
Language	Greek

Course Title	**ADVANCED TOPICS IN URBAN PLANNING**
Course Code	**ARH 549**
Course Type	**Elective**
Level	Postgraduate
Year / Semester	2nd Year / Winter Semester

Teacher's Name	Andreas L. Savvides / Adjunct Faculty				
ECTS	8	**Lectures / week**	1 (1.5 hours)	**Laboratories / week**	1 (1.5 hours)
Course Purpose and Objectives	Subjects in this course will vary according to emerging students' needs or requests and the faculty's educational and research interests.				
Learning Outcomes	The coursework consists of a workshop and a survey course based on best practices in sustainable urban design and development, with a particular focus on the challenges facing the Eastern Mediterranean region.				
Prerequisites	-		**Required**	-	
Course Content	The coursework is organized in the form of a workshop and includes thematic presentations, the analysis of cases studies, role playing and visioning exercises and a final master-planning exercise in a location to be specified by the instructor.				
Teaching Methodology	A holistic approach of a multidisciplinary nature is followed based on weekly reviews and complementary lectures of related themes.				
Bibliography	Reader of related texts and precedents.				
Assessment	• Course attendance and participation: 40% • Final presentation and assignment submission: 60%				
Language	Greek				

Annex 2

Master in Energy Technologies and Sustainable Design

Postgraduate Prospectus

INTERDISCIPLINARY APPROACH
4 ENGINEERING TRACKS

SPONSORED BY:

MINISTRY OF ENERGY
COMMERCE AND INDUSTRY

University of Cyprus

UNIVERSITY OF CYPRUS
Faculty of Engineering
1 Panepistimiou Avenue
2109 Aglantzia, Nicosia
P.O. Box 20537, 1678 Nicosia, Cyprus

TABLE OF CONTENTS

1. INTRODUCTION

The Interdepartmental Postgraduate Program "Energy Technologies and Sustainable Design" (IPP-ETSD) offers specialization in the field of Energy Technologies, within the framework of Sustainable Design. The interdisciplinary nature of the Master's Program provides students with the opportunity to come engage with subjects from a wide range of scientific backgrounds, and collaborate with fellow students of different disciplines to develop synergies and complementarities in achieving common objectives. Graduates of the program can thus gain a more comprehensive and multidisciplinary training in a diverse subject area such as *Energy*.

1.1 Feasibility and Goals

The key objectives of the IPP-ETSD program of the Faculty of Engineering are:

- to properly prepare the engineering-scientist graduates so that they can successfully address current local and global energy challenges and demands, and

- to offer a unified interdisciplinary scientific training and understanding in a wide range of energy-related topics, through the framework of sustainable design.

Through the multi-faceted education offered to students, the concept of Energy as well as the ways of its distribution and utilization is studied in a way that is consistent with contemporary conceptualizations of notions such as sustainability and energy saving.

Moreover, students have the opportunity to work as members of a multidisciplinary team on the development of a complex, large-scale project that requires collaboration across multiple disciplines, reflecting the expertise of the four participating Departments of the Faculty of Engineering. This activity will help students develop a shared foundation essential for implementing projects in real-world conditions, where an understanding of fundamental principles across all disciplines is necessary. Furthermore, it fosters a sense of teamwork and a holistic perspective on projects aiming to maximize synergies in sustainable design and energy efficiency.

1.2. Offered Programs of Study

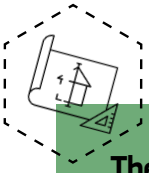
The interdepartmental postgraduate program in Energy Technologies and Sustainable Design of the Faculty of Engineering at the University of Cyprus offers the possibility of joining one of the following Master programs of studies:

1. **Master of Engineering (M.Eng.)**, a professional Master's degree, where emphasis is placed on courses, seminars and a project focused mostly on practical applications.

2. **Master of Science (M.Sc.)**, a Master's focusing on courses, seminars and projects that mainly emphasize research and innovative design.

1.3 Collaborating Departments

The IPP-ETSD has been offered by the Faculty of Engineering of the University of Cyprus since September 2010. In this postgraduate program, all the Departments of the Faculty of Engineering of the University of Cyprus are involved (in alphabetical order):



Department of Architecture (ARH)

The Department of Architecture offers opportunities to develop critical thinking skills through the review and evaluation of the broader concept of sustainability in the built environment. Specific courses with a technological emphasis provide expertise in topics related to the integrated and environmental design of buildings across various building scales, from the building scale to construction details.

Department of Civil & Environmental Engineering (CEE)

The Department of Civil & Environmental Engineering offers research and education opportunities to help transition from the current energy-consuming built environment to a sustainable one. This transition is based on a combination of high energy efficiency in buildings, the utilization of renewable energy sources, and energy conservation, ensuring optimal human comfort and environmental protection.

Department of Electrical & Computer Engineering (ECE)

The Department of Electrical & Computer Engineering is engaged in research, teaching and technological development in key areas of energy technologies and energy systems design. Its primary focus is on efficiency, optimal and safe operation of electric power grids, as well as the study and research of renewable energy sources and their integration into the energy balance.

Department of Mechanical & Manufacturing Engineering (MME)

The Department of Mechanical & Manufacturing Engineering provides opportunities for (future) professionals currently involved or planning to be involved with "green" generation systems, energy storage and conservation, to deepen their knowledge of basic theoretical and practical concepts, as well as to gain insights into the latest technological developments in this field.

The master's program is offered in English.

1.4 Procedure and Criteria of Admission

Candidates for admission to the program must hold at least a university degree, awarded by an accredited institution in the country where it operates, or a degree recognized as equivalent to a university degree by the Cyprus Council for the Recognition of Higher Education Qualifications (KY.S.A.T.S), in a relevant field of science or engineering. Applicants may submit a formal request to one or more Departments, through the **Graduate School** within specified deadlines (twice a year). Applications are evaluated and approved by the Board of the respective Department. Beyond the **basic admission criteria** student selection is also based on the following:

- The quality of the candidate's academic background, in both depth and breadth, as well as past achievements undergraduate or graduate studies.

- Evidence of the candidate's ability to implement existing technologies and develop innovative ones in the proposed area of study.

Moreover, for admission to the Master of Science Program, candidates must demonstrate their ability to conduct substantial research in the proposed field of study.

1.5. Academic and Research Supervisors

The main objective of the program is to ensure that all students will receive adequate and appropriate support throughout their studies. The advisory program consists of:

- **Academic Supervisor:** Upon admission to the program and before the first day of registration, each student is assigned an academic supervisor, who is the representative of his/her Department on the interdepartmental committee of the program. Students can access relevant information in the Banner system, after completing their registration. The academic supervisor meets with the student before the first registration to plan the first semester of studies, assist in course selection and oversee academic progress through regular meetings at the beginning, end, and/or during the semester. The first meeting takes place at the "New Student Introductory Day" held during the week of registration, where all Students Academic Advisors are present.

- **Research Advisor:** (this applied only to students admitted to the **Master of Science (MSc) program**). To carry out their thesis research, students must select a research advisor, who may be different from their academic advisor. It is advisable that the selection of a research advisor be the result of consultation between students and a faculty member that his/her research interests are focused on energy. The Research Advisor may come from any Department within the Faculty, regardless of the students' Department of enrollment. In collaboration with the research advisor, a suitable and specific thesis topic must be determined. Following the submission and approval of the thesis proposal, the student, in collaboration with the research advisor, must form the thesis committee.

1.6. Financial Support

The University of Cyprus supports several postgraduate students through teaching assistant positions, the availability of which depends on the teaching needs of each department, as well as through research project support. Additionally, there are further funding opportunities, with relevant information available at the Career Centre and the Academic Affairs and Student Welfare Service.

The University of Cyprus offers several scholarships to both newly admitted students and students already enrolled to a postgraduate program. Application details are regularly posted on the **Graduate School website**.

1.7. Degree Award – ECTS system

Students that fulfill the requirements of the program are awarded a master's degree from the department to which they have been accepted. The postgraduate program in Energy Technologies and Sustainable Design is structured according to the ECTS system, with each course's total credits determined by separately evaluating the individual workload for each activity. Each ECTS credit corresponds to a workload of 25-30 hours.

The calculation of credits for each course can be illustrated by the following example. If students choose the course ARH 538 "Environmental Building Design", the required weekly workload includes: 3 hours of teaching (including exercises), no lab hours and 12 hours of homework. Therefore, for one semester consisting of 13 weeks of teaching, and 1 week of study and preparation for the exams, the total workload is as follows:

- Teaching: 3 x 13 = 39 hours
- Lab: 0 x 13 = 0 hour
- Preparation: 12 x 13 + 12 x 1 = 168 hours

Therefore, the total workload for this course is: **39 + 168 = 207 hours**, which corresponds to **8 ECTS** credits.

Master of engineering program

2. MASTER OF ENGINEERING (M.ENG.)

To be awarded the Master's Degree (M.Eng.), students are required to successfully complete the program of studies as outlined below. The minimum duration of the Master of Engineering program for full-time students is three academic semesters. The maximum duration allowed for completion of the master's degree is four years, in accordance with University regulations. It is important to note that the Advanced Project "Capstone Design & Research Project" begins **only every September** and ends in July.

2.1 Program of Studies

The workload required to obtain the master's degree (M.Eng.), involves the completion of at least **90 ECTS** credits, derived from a combination of graduate courses, seminars and lab courses as follows:

Specialization Courses (Compulsory 66 ECTS)	66 ECTS
POL 500: Basic Principles of Interdisciplinary Engineering - **Prerequisite**	1 ECTS
POL 800: Research Methodologies	8 ECTS
ARH 538: Environmental Building Design	8 ECTS
ECE 687: Building Integration of Photovoltaic (PV)	8 ECTS
MME 516: Renewable Energy Sources Technology	8 ECTS
CEE 536: Energy Efficiency Buildings	8 ECTS
Advanced Project: Capstone Design & Research Project	24 ECTS
Engagement with practice and industry	1 ECTS
General Elective Courses (24 ECTS)	
3 Elective Courses	24 ECTS
TOTAL	**90 ECTS**

Master's students are considered full-time if they enroll in courses totaling at least **18 ECTS** per semester, in accordance with University of Cyprus regulations.

2.2 Indicative Program of Studies for Master's Degree M.Eng.

The determination of the appropriate combination of courses, research, and seminars for each semester will be carried out by the students in coordination with their academic advisors. The following table presents an indicative example of an M.Eng. degree program.

Example: Indicative Program (admission in September)

1st semester (fall)		**2nd semester (spring)**	
MME 516 (compulsory)	8 ECTS	ARH 538 (compulsory)	8 ECTS
CEE 536 (compulsory)	8 ECTS	ECE 687 (compulsory)	8 ECTS
POL 800 (compulsory)	8 ECTS	Advanced Project II	8 ECTS
Advanced Project I	6 ECTS	Engagement with practice and industry	1 ECTS
Prerequisite[1]	1 ECTS		
TOTAL	**31 ECTS**	**TOTAL**	**25 ECTS**

Summer[2]		**3rd semester (fall)**	
Advanced Project III	10 ECTS	3 elective courses	3 x 8 = 24 ECTS
TOTAL	**10 ECTS**	**TOTAL**	**24 ECTS**

1. For the mandatory prerequisite (POL 500), students will be notified before the beginning of each academic year regarding the dates and times.

2. Note that during the summer semester students are allowed to select courses of no more than 15 ECTS in total.

Master of science program

3. MASTER OF SCIENCE (M.SC.)

To be awarded the Master of Science (M.Sc.) students are required to successfully complete the program of studies as well as the Thesis Research and the Advance Project, as outlined in detail below. The minimum duration of the Master of Science (M.Sc.) program for full-time students is three academic semesters. The maximum duration allowed for completion of the Master's degree is four years, in accordance to university regulations. It is important to note that the Advanced Project "Capstone Design & Research Project" begins **only every September** and ends in July.

3.1 Program of Studies

The workload required to obtain the Master's (M.Sc.) degree involves the completion of at least 96 ECTS credits derived from a combination of graduate courses, seminars, advanced project and thesis research as follows: ECTS credits, derived from a combination of graduate courses, seminars and lab courses as follows:

Specialization Courses (Compulsory)	
POL 500: Basic Principles of Interdisciplinary Engineering - **Prerequisite**	1 ECTS
POL 800: Research Methodologies	8 ECTS
ARH 538: Environmental Building Design	8 ECTS
ECE 687: Building Integration of Photovoltaic (PV)	8 ECTS
MME 516: Renewable Energy Sources Technology	8 ECTS
CEE 536: Energy Efficiency Buildings	8 ECTS
Advanced Project: Capstone Design & Research Project	24 ECTS
Engagement with practice and industry	1 ECTS
Master Thesis Research	30 ECTS
	TOTAL 96 ECTS

Master's students are considered full-time if they enroll in courses totaling at least **18 ECTS** per semester, in accordance with University of Cyprus regulations.

3.2 Indicative M.Sc. Master's Degree Program

The determination of appropriate courses, research and seminars for each semester will be carried out by the students in coordination with their academic advisors. The following table presents an Indicative example of an M.Sc. degree program which can be completed within three academic semesters.

Example: Indicative Program (admission in September)

1st semester (fall)		**2nd semester (spring)**	
MME 516 (compulsory)	8 ECTS	ARH 538 (compulsory)	8 ECTS
CEE 536 (compulsory)	8 ECTS	ECE 687 (compulsory)	8 ECTS
POL 800 (compulsory)	8 ECTS	Advanced Project II	8 ECTS
Advanced Project I	6 ECTS	Engagement with practice and industry	1 ECTS
Prerequisite[1]	1 ECTS	Master Thesis Research I	6 ECTS
TOTAL	**31 ECTS**	TOTAL	**31 ECTS**

Summer[2]		**3rd semester (fall)**	
Advanced Project III	10 ECTS	Master Thesis Research II	8 ECTS
		Master Thesis Research III	8 ECTS
		Master Thesis Research IV	8 ECTS
TOTAL	**10 ECTS**	TOTAL	**24 ECTS**

1. For the mandatory prerequisite (POL 500), students will be notified before the beginning of each academic year regarding the dates and times.

2. Note that during the summer semester students are allowed to select courses of no more than 15 ECTS in total.

Specialization courses

4. SPECIALIZATION COURSES

A student must successfully complete a number of postgraduate specialization courses from those available in the Interdepartmental Postgraduate Program of Studies, securing the minimum number of ECTS credits required by each program. Below is a list of specialization courses typically offered over time (not all courses are available in the same semester or year). An indicative timetable for the current semester is posted on the ETSD Program website. Note that, due to broad and varied course offerings within the interdepartmental program, part-time students should be aware that a limited number of courses are offered during the morning and midday hours.

List of Specialization Courses (Compulsory)

Department of Architecture	
ARH 538: Environmental Building Design	8 ECTS
Department of Electrical and Computer Engineering	
ECE 687: Building Integration of Photovoltaic (PV)	8 ECTS
Department of Mechanical and Manufacturing Engineering	
MME 516: Renewable Energy Sources Technology	8 ECTS
Department of Civil and Environmental Engineering	
CEE 536: Energy Efficiency of Buildings	8 ECTS
Interdepartmental Postgraduate Program (ETSD)	
POL 500: Basic Principles of Interdisciplinary Engineering - **Prerequisite**	1 ECTS
POL 800: Research Methodologies	8 ECTS
POL 700: Engagement with practice and industry	1 ECTS
POL 604: Advanced Project: Capstone Design & Research Project I	6 ECTS
POL 704: Advanced Project: Capstone Design & Research Project I II	8 ECTS
POL 804: Advanced Project: Capstone Design & Research Project I III	10 ECTS

List of Elective Courses

Department of Architecture	
ARH 539: Advanced Topics in Architectural Technology	8 ECTS
ARH 549: Advanced Topics in Urban Planning	8 ECTS
ARH 550: Special Topics of Recording and Documenting Building and Sites	8 ECTS
Department of Electrical and Computer Engineering	
ECE 680: Power System Analysis	8 ECTS
ECE 681: Power System Operation and Control	8 ECTS
ECE 685: Power System Plant and Operation	8 ECTS
ECE 686: Power System Modeling	8 ECTS
ECE 688: Operation and Economics of Sustainable Power Systems	8 ECTS
Department of Mechanical and Manufacturing Engineering	
MME 512: Advanced Engineering Thermodynamics	8 ECTS
MME 517: Solar Energy Systems	8 ECTS
MME 566: Advanced Semiconductor Materials and Nanodevices	8 ECTS
Department of Civil and Environmental Engineering	
CEE 580: Dynamics of the Atmosphere and Air Pollution Dispersion	8 ECTS
CEE 586: Sustainable Built Environment	8 ECTS
CEE 596: Marine and Wind Energy	8 ECTS
CEE 598: Biotechnological production of biofuels and bioenergy	8 ECTS

4.1. Detailed Descriptions of Courses

This section provides detailed descriptions of specialization courses. It is important to note that some courses may undergo modifications to further enhance and update their content in accordance to the latest scientific findings. Additionally, certain courses may have prerequisites, which would require students to successfully complete specific courses before registering for a postgraduate course. It is the students' responsibility to ensure they meet these prerequisites.

ARH 538
Environmental Building Design
Compulsory

(8 ECTS)

This course aims to develop students' theoretical and applied knowledge of Environmental Design of Buildings, highlighting the role of architectural design, construction and appropriate technical support in ensuring proper living conditions, minimizing energy consumption and reducing adverse environmental impacts. The course covers topics related to bioclimatic architecture, which focuses on enhancing user comfort – including thermal, visual, acoustic comfort, as well as indoor air quality. It also address energy-efficient design strategies to minimize the energy consumption of the building envelope and explores methods of ecological construction aimed at reducing the ecological footprint.

ARH 539
Advanced Topics in Architectural Technology

(8 ECTS)

Subjects covered in this course may vary based on emerging student needs, requests and the educational and research interests of the faculty. Emphasis is placed on heat transfer mechanisms, funda–mental environmental design principles (including lighting, ventilation, climatic adaptability), and the integration of hybrid systems and renewable energy source (RES) technologies in the design of double-skin facades and ceilings. The course aims equip students with the necessary skills to develop an energy-orientated design methodology, particularly towards high- performance building envelopes.

ARH 549
Advanced Topics in Urban Planning

(8 ECTS)

Subjects covered in this course may vary based on emerging student needs, requests and the faculty's educational and research interests. The coursework consists of a workshop and a survey course focusing on best practices in sustainable urban design and development, with a particular emphasis on the challenges faced in the Eastern Mediterranean region. The course is structured in a workshop format and includes thematic presentations, case study analyses, role-playing and visioning exercises and a final master-planning exercise at a location specified by the instructor.

ARH 550
Special Topics of Recording and Documenting Building and Sites

(8 ECTS)

The course provides both fundamental and advanced knowledge on recording and documenting buildings and sites using conventional and contemporary digital techniques. It introduces research tools and methodological approaches for in-situ recording of buildings, sites and individual building elements, as well as methodologies for evaluating and processing monitoring data. Moreover, the course covers the recording and analysis of indoor comfort and energy efficiency of buildings. It addresses the documentation of functional particularities and specific comfort requirements, while it includes quantitative recordings and analysis of the parameters that define comfort conditions.

ECE 680
Power System Analysis

(8 ECTS)

The course covers fundamental and advanced concepts of power system analysis, focusing on developing students' skills towards performing power systems analysis. Students will learn to analyze balanced and unbalanced systems using symmetrical components, study transformers and per unit sequence models, and explore transmission line modeling, power flow solution techniques, bus impedance and admittance matrices, and power system stability. Through projects and term papers, students will gain a deep understanding of power systems operations, equipping them with the necessary skills to enter the workforce as network engineers or conduct research in this field.

ECE 681
Power System Operation and Control

(8 ECTS)

The course covers the fundamental principles of power generation and control in power systems. Including economic dispatch, unit commitment, and automatic generation control. It introduces linear and dynamic programming techniques for problem-solving and explores topics such as steam and hydro unit operation, fuel scheduling, production costing, observability, state estimation, power flow analysis, and neoliberal deregulation in the energy sector.

ECE 685
Power System Plant and Operation
Prerequisite ECE 680

(8 ECTS)

A power system plant encompasses all the equipment, including structural components that constitute a unified power source. This module aims to introduce the overall design of power plant systems, focusing on both system-scale and on component-scale design. The course provides an overview of the manufacturing, operational, and thermal aspects of power systems, as well as the key decisions required to achieve an optimal power plant design. Specifically, it covers fundamental plant parameters, by introducing the following concepts:

- Overhead transmission lines: Design and operation
- Underground power cables: Design and operation
- Power transformers: Design and operation
- Technical and economic assessment of power systems

ECE 686
Power System Modeling
Prerequisite ECE 685

(8 ECTS)

A number of events and challenges, exacerbated at the onset of the 21st century, along with future challenges, necessitate a thorough understanding of the operating principles and key features of a Power System Plant, an essential aspect for power engineers. This module includes simulation-based exercises covering the following topics:

- Overhead line design and parameter evaluation
- Thermal rating of HV underground power cables
- Electric field stress on insulation materials in power cables

through the use of finite element modeling

- Modeling of non-linear properties of transformer core characteristics and design
- Loss evaluation in transformer structural components under saturation conditions
- Final comprehensive exercise based on areal-case scenario

ECE 687
Building Integration of Photovoltaic (PV)
Compulsory

(8 ECTS)

This graduate-level course introduces students to Building-Integrated Photovoltaics (BIPV) within the context of Nearly Zero Energy Buildings (NZEB). The course includes a review of current policies, directives, regulations, and goals related to building energy efficiency and NZEBs. Students can explore advanced components, technologies, tools, systems, techniques, and theories used to model buildings for achieving NZEB design and incorporating BIPV. The course also covers the calculation of the size and cost of a system designed to offset a building's energy consumption. In addition, the course examines smart systems for energy management and grid integration, including monitoring of consumption, Renewable Energy Source (RES) generation, and environmental conditions, as well as case studies of smart meter projects.

ECE 688
Operation and Economics of Sustainable Power Systems

(8 ECTS)

This course introduces students to the fundamental principles governing the economic, secure, and reliable operation of sustainable power systems and electricity markets particularly with the integration of variable and uncertain renewable energy sources. It revolves around the concept of the "affordability-sustainability-security" energy trilemma, which seeks to balance between operating power systems at low cost (affordability), meeting environmental targets (sustainability), and ensuring grid reliability (security). To analyze this trilemma within a competitive market context, the course covers key topics such as the fundamentals of economics, electricity market operations, optimal bidding strategies for various market participants, the economics of transmission and distribution networks, and the roles of emerging technologies and commercial entities like energy storage and aggregators. Additionally, the course delves into different aspects of power system reliability, ranging from system-level requirements and constraints to the provision of ancillary services offered by market participants. Basic optimization concepts such as linear, quadratic, and mixed integer linear programming, are also covered to equip students with the necessary tools for understanding and modeling the operations of current and future power systems and energy market.

MME 512
Advanced Engineering Thermodynamics

(8 ECTS)

The course covers topics related to the thermodynamic analysis of engineering systems, with an emphasis on a systematic methodology for applying basic thermodynamic principles. It introduces availability analysis and explores the thermodynamics of gas mixtures and air-conditioning applications. Additionally, the course covers modern computational equations of state, thermodynamic design software, and the thermodynamics of biological systems. An introduction to compressible flow is also included, providing students with a comprehensive understanding of thermodynamic processes and their applications in various engineering fields.

MME 516
Renewable Energy Sources Technology
Compulsory

(8 ECTS)

The course focuses on the energy consumption versus energy sources issue, exploring mineral resources and conventional technologies of energy generation, such as nuclear, oil, gas and coal combustion. It covers the historical development and current status of energy generation and storage technologies worldwide, in Europe and locally. The course delves into Renewable Energy Resources (RES) technologies and their role in creating a sustainable energy future, examining both short and long-term prospects. Students will learn methods to predict the potential and annual energy yield of various systems, including wind potential, wind turbines and their performance. The topics covered also include solar geometry and solar potential solar-thermal and photovoltaic systems, and both passive and active solar-thermal systems, As well as bio-climatic architecture, hydroelectric power, biomass systems, and geothermal potential and technologies. Finally, the courses explore “blue” energy systems estimating potential and examining energy from tides, waves and currents. Finally, hydrogen and fuel cells are introduced as part of the broader sustainable energy landscape.

MME 517
Solar Energy Systems

(8 ECTS)

This course provides students an insight into the most commonly used solar energy technologies including photovoltaics, solar collectors, flat plate collectors, parabolic trough collectors and more. The primary objective of the course is to equip students with the knowledge and techniques needed to analyze solar thermal systems and their characteristics. Special emphasis is placed on the solar characteristics of Cyprus, as well as on both passive and thermal methods of exploiting solar radiation. Students will gain a deeper understanding of the various solar technologies and how to apply them in real-world contexts, with a focus on maximizing efficiency and sustainability in solar energy systems.

MME 566
Advanced Semiconductor Photovoltaic Devices

(8 ECTS)

The course provides an introduction to semiconductors, covering intrinsic, n-type, and p-type materials. Topics include carrier transport, the Hall effect, resistivity, photo conductivity, the infinite quantum well, 3D DOS, Fermi-Dirac statistics, carrier concentration, and the law of mass action. It also examines the temperature dependence of carrier density, mobility, and scattering mechanisms. The course discusses energy band diagrams, the Fermi level, and its temperature dependence. Additionally, the behavior of the p-n junction in equilibrium is explored, along with forward and reverse bias under dark and light conditions. The p-n junction photovoltaic device is analyzed, including open circuit voltage, short circuit current, efficiency, fill factor, and I-V characteristics, along with the fabrication of p-n junctions. The derivation of 2D and 1D DOS, quantum wells, wires, and dots is also covered. Finally, the course addresses nano-wires, VLS growth, axial and core-shell structures, nano-wire device fabrication, and nano-wire solar cells.

CEE 536
Energy Efficiency of Buildings
Compulsory

(8 ECTS)

The course introduces the basic principles of energy efficiency in buildings, focusing on the methodology of energy analysis. The topics covered include steady and unsteady heat transfer in two- and three-dimensional analyses of structural materials and components, considering conduction, convection, and radiation. The course also addresses prerequisites for energy efficiency, materials for thermal insulation, and simulation methods for assessing energy performance. Students will learn about certification processes and European and Cypriot standards and codes related to energy efficiency. Other key topics include the assessment of energy efficiency, optimized technologies for energy-efficient design, and passive cooling and heating strategies. The course also includes case studies of various building types (residential, office, and commercial buildings), providing practical insights into energy-efficient design and implementation.

CEE 580
Dynamics of the Atmosphere and Air Pollution Dispersion

(8 ECTS)

The course aims to develop a fundamental understanding of air pollution dispersion particularly in the urban atmosphere and enable students to apply the fluid mechanical principles both in research and operational contexts. The course will cover: sources, sinks and receptors of air pollution, causes and consequences, meteorology and climatology, density-stratified fluid mechanics, internal waves, flow over topography, air quality, atmospheric chemistry, turbulence, turbulent flows including reacting flows, turbulence modeling.

CEE 586
Sustainable Built Environment

(8 ECTS)

The course equips students with a holistic approach and a comprehensive understanding of the fundamental aspects and current challenges in the sustainable design of the built environment. Topics covered include climate change, urban physics, environmental pollution, global energy demands, sustainable building materials, rational water use, waste management, and renewable/alternative energy technologies. Additionally, the course explores the perception of human comfort, ecological footprint analysis, and the legal framework surrounding sustainable design. Students will also learn about environmental and operational management strategies. The course demonstrates examples of both sustainable and unsustainable practices in current built environment design, highlighting how international policy frameworks can serve as both drivers and barriers to sustainable solutions.

CEE 596
Marine and Wind Energy

(8 ECTS)

The module is designed for students from various scientific backgrounds, who are interested in the marine environment and wish to specialize in renewable energy. The aim is to introduce the technical, environmental and, to a lesser extent, financial and legislative challenges of marine renewables, particularly wind and wave energy. This goal is achieved through:

1. Examining the natural variation of marine renewable energy sources.
2. Learning about the principles of energy conversion in these systems.
3. Analyzing the design fundamentals of marine and wind energy systems.
4. Exploring a range of environmental and financial constraints related to the implementation of these technologies.

CEE 598
Biotechnological Production of Biofuels and Bioenergy

(8 ECTS)

The biotechnological production of biofuels and bioenergy course focuses on utilizing waste to produce energy and fuels with the goal of reducing environmental pollution. The course aims to provide an understanding of the basic processes of biofuel production (such as biogas, hydrogen, bioethanol, biodiesel) and the biotechnological processing of waste in this context. Students will be trained in the analysis, design, control and optimization of bioprocesses for biofuels and bioenergy production, as well as (bio)processing of waste materials.

POL 800
Research Methodologies
(8 ECTS)

The course introduces students to both qualitative and quantitative research methodologies, focusing on the principles of simulation and the application of basic data collection, statistical analysis,

and organization methods. It also covers experimental laboratory and field methodologies, as well as computational approaches. Students will learn about basic analysis of error and uncertainty, gaining essential tools for efficiently executing and presenting their completed master thesis. Additionally, the course prepares students for academic journal publications, poster presentation at conferences and other academic dissemination formats.

5. GRADUATE SEMINARS

The course introduces students to basic engineering principles and concepts, fostering a shared, foundational, interdisciplinary background in Engineering. This enables students from different departments within the Engineering Faculty to take classes across these departments, through the ETSD postgraduate program, and be introduced to the program's interdisciplinary nature. The course will be offered before the start of the academic year and will have a duration of 12 hours.

POL 500
Basic Principles of Interdisciplinary Engineering
Compulsory Prerequisite

(1 ECTS)

Educational visits (4) will be organized throughout the academic year, to sites and organizations related to the field of energy. Through these visits, students will receive detailed information on current practices, challenges, prospects and issues within the energy industry. Indicative visits may include wind and photovoltaic parks, bioclimatic buildings, and air quality monitoring stations operated by the Department of Labour Inspection, among others.

POL 700
Engagement with Practice and Industry

(1 ECTS)

6. ADVANCED PROJECT: CAPSTONE DESIGN & RESEARCH PROJECT (24 ECTS)

For the Master's degree students are required to carry out an Advanced Project, specifically a "Capstone Design & Research Project", which will be prepared and presented in collaboration with fellow students from various specialties. The "Capstone Design & Research Project" addresses topics that reflect the interdepartmental nature of the Program and emphasizes the importance of collaboration under real-world conditions.

Students are divided into groups and tasked with designing a project based on predetermined requirements. This project is intended to integrate the learning outcomes from the Research Methodologies course, allowing students to apply knowledge gained from the various courses they completed throughout the Program to their project. The collaborative nature of the workload of the Advanced Project, encourages knowledge exchange among team members and presents students with the opportunity to translate theory into practical application.

In this way, students are better prepared to apply their theoretical knowledge into practical scenarios and gain experience working in a larger team, where each member is required to contribute both individually, and collaboratively towards the common objective of the Design & Research Project integration. In case of failure of one of the three chain courses, the student must register for the project again, staring from module I (POL 604).

POL 604
Capstone Design & Research Project I
(6 ECTS)

Design Project in collaboration with students of other disciplines under the supervision of academic staff.

POL 704
Capstone Design & Research Project II
(8 ECTS)

Design Project in collaboration with students of other disciplines under the supervision of academic staff.

POL 804
Capstone Design & Research Project III
(10 ECTS)

Design Project in collaboration with students of other disciplines under the supervision of academic staff.

7. MASTER M.SC. THESIS RESEARCH (30 ECTS)

The following courses comprise the different stages of postgraduate research, leading to the completion and defense of the Master thesis (M.Sc).

POL 718 Master Thesis Research I (6 ECTS)

POL 719 Master Thesis Research II (8 ECTS)

POL 720 Master Thesis Research III (8 ECTS)

POL 721 Master Thesis Research IV (8 ECTS)

The selection of a research advisor is recommended to be the result of consultation between students and a faculty member whose research interests focus on energy. The student's research topic is chosen in coordination with their research supervisor preferably before the end of the first semester. Registration takes place in the Banner audience of the respective professors supervising the thesis. Before starting the thesis, it is recommended to sign a Cooperation Agreement.

Students must submit in writing to the interdepartmental committee a single-page summary of the thesis explaining its relevance to the field and Program, no later than six months prior to its defense. When the thesis is completed, the student must present it to an open audience, before the Examination Committee. The Examination Committee is composed of three members: the

research supervisor as Chair of the Committee and (at least) one faculty member from another department of the interdepartmental program. The members of the Committee must be selected based on their scientific background to ensure they are able to support the students' work. If the defence of the research is satisfactory, the Examination Committee approves its successful completion. The thesis is accredited as Excellent, Very Well, or Well. In case of rejection, the student is entitled to resubmit it once. The resubmission must be done within eight semesters, which is the maximum duration of study for a master's student.

Upon successful completion of the thesis, students must submit a digital version of their work with a graphic abstract to the central Secretariat of the program, as well as submit it to the **Library**. For specifications and instructions on the preparation, writing and submission of the Master's thesis, students can visit the **Graduate School website.**

8. GENERAL ELECTIVE COURSES

According to the Postgraduate Studies Rules, postgraduate students may replace a general elective course (corresponding to 8 ECTS credits), with up to one advanced undergraduate course. The list of advanced undergraduate courses that would be particularly helpful for postgraduate specialization courses in the ETSD Program is given below.

Note that the ECTS credits for each undergraduate course may vary and graduate students may need additional credits to fulfill the required amount for completing the ETSD program of studies. Students must obtain approval from the Academic Committee of IPP-ETSD to register. Additionally, students who hold a degree in the same field of study and have already attended courses on a relevant subject are not allowed to credit advanced undergraduate courses

List of Undergraduate General Elective Courses

Department of Architecture	
ARH 412: Architecture and the Critical History of Ecology	5 ECTS
Department of Electrical and Computer Engineering	
ECE 340: Power Engineering	6 ECTS
ECE 447: Renewable Energy Sources: Photovoltaics	6 ECTS
Department of Mechanical and Manufacturing Engineering	
MME 217: Heat Transfer	5 ECTS
Department of Civil and Environmental Engineering	
CEE 438: Transport Processes in Environmental Engineering	5 ECTS

8.1. Detailed Description of General Elective Undergraduate Courses

ARH 412
Architecture & the Critical History of Ecology
(5 ECTS)

How have the concepts of "Nature" and "Environment" influenced architectural thought and practice throughout history? Emphasis is placed on the 20th and 21st century debates on the environment and sustainability, as well as their theoretical dimensions.

ECE 340
Power Engineering

(6 ECTS)

The course introduces power system components, including magnetic circuits, inductors, transformers, and their equivalent circuits. It covers the generation, transmission, and utilization of electric power, as well as three-phase AC and DC systems. Fundamentals of electromechanical energy conversion are explored, along with power semiconductors, including basic devices and circuit applications. The course also examines DC/DC converters—such as buck, boost, and buck-boost converters—and their derivatives, focusing on basic operation and design criteria. Additionally, it addresses AC circuits, including SCR phase control, inverters, and uninterruptible power supplies (UPS).

ECE 447
Renewable Energy: Photovoltaics

(6 ECTS)

The course provides an overview of renewable energy sources, with a primary emphasis on photovoltaic (PV) energy conversion. It covers the current state and potential of PV energy in Cyprus, as well as different types of photovoltaic systems. The course explores the history of photovoltaic technology development and its current status in terms of technology, policy, and markets. Topics include solar insolation, a brief review of semiconductor properties, and an introduction to generation, recombination, and the fundamental equations of device physics. Additionally, it examines efficiency limits, losses, and measurement techniques. The physics of photovoltaic systems are discussed, including their basic operating principles, design, technology, and performance at both the individual solar cell and system levels. The course also addresses current fabrication technologies and the design of solar cells and modules.

MME 217
Heat Transfer

(6 ECTS)

The course examines thermal expansion, as well as the coefficients of conductivity and diffusivity. It covers mechanisms of heat transfer (HT), including the electrical analog of HT, thermal resistance, and equivalent thermal circuits. Topics include steady conduction with or without internal heat sources, analytical solutions for flat walls, cylinders, and spheres, as well as steady conduction in two dimensions, shape factors, and numerical solutions. The course

also explores heat transfer from finned surfaces, transient heat transfer, dimensional analysis, the lumped capacitance method, forced and natural convection, boiling and condensation, and heat exchangers. Laboratory exercises are included as part of the course.

CEE 483
Transport Processes in Environmental Engineering

(5 ECTS)

The course explores the fundamentals of pollutant transport mechanisms (advection, diffusion, and dispersion) in air, water, and ground media. it covers gaussian plume dispersion models, LaGrangian diffusion, and Taylor's dispersion. Additional topics include air and water quality assessment, environmental design, and mitigation strategies. The course also examines heat transfer and energy considerations for building design.

9. CONTACT INFORMATION

For information regarding the Interdepartmental Postgraduate Program ETSD (e.g., seminars), students may contact the coordinating secretariat.

Email: energytech@ucy.ac.cy
Tel: 00357-22895400
Office Hours: Monday – Friday: 08.00- 18.00

To introduce newly enrolled students to the IPP-ETSD, a meeting is organized at the beginning of each semester. This meeting is held to provide essential information, resolve any queries, and assist with the registration process. For the latest information and updated details on the Interdepartmental Postgraduate Program "Energy Technologies and Sustainable Design" as well as the program prospectus, students can visit the **program's website**.

9.1 Departmental Contact Info

For general information regarding topics such as studies, registration, organization and student support, students may contact the secretariat of their department.

Office Hours: Monday- Friday: 07.30 – 14.30

Department of Architecture
Email: arch@ucy.ac.cy,
Tel: 22892980

Department of Electrical & Computer Engineering
Email: ece@ucy.ac.cy
Tel: 22894189

Department of Mechanical & Manufacturing Engineering
Email: mpe@ucy.ac.cy
Tel: 22892250

Department of Civil & Environmental Engineering
Email: cee@ucy.ac.cy
Tel: 22892200

9.2 Academic Committee IPP-ETSD

Andreas Savvides
Associate Professor, Program Coordinator
Department of Architecture
Email: savvides.andreas.1@ucy.ac.cy
Tel: 22892967

Mathaios Panteli
Assistant Professor
Department of Electrical & Computer Engineering
Email: panteli.mathaios@ucy.ac.cy
Tel: 22892291

Stavros Kassinos
Professor
Department of Mechanical & Manufacturing Engineering
Email: kassinos@ucy.ac.cy
Tel: 22892296

Dimitris Stagonas
Assistant Professor
Department of Civil & Environmental Engineering
Email: stagonas.dimitris@ucy.ac.cy
Tel: 22893522

Annex 3

Graduate Tracking and Professional Placement Form

1. **Contact Information**
    - Full Name:
    - Contact Phone Number:
    - Email:
    - Additional Contact Information (e.g., LinkedIn, personal website):
2. **Academic Information**
    - Bachelor's Degree Title:
    - University:
    - Graduation Year:
    - Thesis (Title and Brief Description):
    - Master's Degree Title:
    - University: University of Cyprus
    - Graduation Year:
    - Thesis (Title and Brief Description):
    - Additional Certifications/Seminars:
3. **Professional Placement**
    - Current Employment (Yes/No):
    - Employer:
    - Job Title:
    - Employment Sector:
    - Work Location (Local/National/International):
    - Job Start Date:
    - Previous Job Positions:
    - Participation in Professional Associations or Networks:
4. **Networking & Participation in Activities**
    - Participation in Program Events (Yes/No):
    - Interest in Mentoring New Students:
    - Would you like to receive updates from the program after graduation? (Yes/No)

Graduate's Signature

Date:

The purpose of this form is to create a database for the graduates of the ETSD program, as well as to track their professional career paths. The data will be used exclusively for internal purposes and communication with the graduates.

Annex 4

Course Title	**Advanced Project: Capstone Design & Research Project I, II, III**				
Course Code	**POL 604, POL 704, POL 804**				
Course Type	Obligatory				
Level	Post-graduate				
Year / Semester	Post-graduate students/ Winter, Spring, and Summer				
Teacher's Name	Dr. Andreas Tjirkallis, Dr. Nestoras Antoniou				
ECTS	6 / 8 / 10	Lectures / week	3	Laboratories / week	-
Course Purpose and Objectives	The holistic design approach of the energy projects and the implementation of the theoretical and practical knowledge that the students gain in their post-graduate studies, under the realistic working conditions.				
Learning Outcomes	The understanding of the synergies and values that are developed due to the involvement of different background engineers on the design of an energy project and the optimization of the deliverable due to synthetic approach.				
Prerequisites	-	Required	-		
Course Content	The Capstone Design includes topics that are related to the interdepartmental character of the Program, as well as topics concerning the collaboration of students in as much as possible real conditions. Students are divided into groups and undertake the design of a project according to predetermined requirements. The work is shared and the knowledge gained by students through the courses offered throughout the program is implemented in conditions of a project design. In this way, students are better prepared to transfer their knowledge into practical applications and gain experience from participating in a larger group where everyone is performing part of the work but at the same time all students work together towards the common objective of the Design Project integration.				
Weekly plan **POL 604**	Week 1: Course Introduction: Overview of course objectives, expectations and assessment methods Week 2: Students background presentation – working groups Week 3: Building and climate: projections and challenges Week 4: Urban microclimate and sustainable development Week 4: Introduction of individual and group assignments Week 5: Building fabric Week 6: Heat flow and Energy transfer Week 7: Introduction to Building Energy Modeling (BEM) Week 8: Energy codes, standards and guides Week 9: Introduction to HVAC				

	Week 10: Indoor and outdoor thermal comfort assessment Week 11: Building Energy Modeling: Weather files, Geometry, Construction materials Week 12: Building Energy Modeling: Activity schedules, Lighting, HVAC Week 13: Daylight physics and Modeling Week 14: Principles of Fluid Dynamics Simulations, air quality assessment and ventilation Week 15: Validation and Verification
Weekly plan **POL 704**	Week 1: Principles of Carbon footprint Week 2: Life Cycle Analysis Week 3: Advanced HVAC topics Week 4: Passive design strategies Week 5: Renewable Energy Systems Week 6: Visual comfort and advanced lighting analysis Week 7: Advances and explorations in Building Energy Modeling Week 8: Group project mid-term presentations and feedback session Week 9: Special topics in Building Energy Renovation strategies Week 10: Building integrated PV and smart building systems Week 11: Policy frameworks Week 12: Environmental Impact Assessment Week 13: Introduction to Techno-economic Analysis Week 14: Embodied energy and Circular economy Week 15: Group presentations, peer review and final feedback session
Weekly plan **POL 804**	Week 1: Cost Analysis – estimate capital costs Week 2: Payback period, Net Present Value (NPV) and Internal Rate of Return (IRR) Week 3: Occupant comfort, user feedback and social impact Week 4: Sensitivity Analysis Week 5: Evaluate long-term resilience Week 6: Finalise design and investment decisions Week 7: Present Techno-economic Analysis to investors, developers and policymakers Week 8: Group presentations, peer review and final feedback session

Teaching Methodology	Lectures Site / Field Visits and measurements Project-Based Learning Research-Based Learning (research on innovation building materials and technologies)
Bibliography	– Watson, D. (ed.) “The Energy Design Handbook.” The American Institute of Architects. Washington, DC. 1993 – Brown G.Z., DeKay M., “Sun, Wind, and Light”, Wiley and Sons, 2014 – ANSI/ASHRAE Standard 55-2013: Thermal Environmental Conditions for Human Occupancy. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2013. – EN ISO 7730 Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria, 2005 – Brager, G. S., de Dear, R. J.: “Thermal adaptation in the built environment: A literature review”, Energy and Buildings 27, 1998 – Givoni B., “Comfort, climate analysis and building design guidelines”, Energy Build, 18 (1) (1992), pp. 11-23. – Poirazis H., “Double Skin Façades. A Literature Review”, Lund Institute of Technology, 2006 – Lee E., Selkowitz S., Bazjanac V., Inkarojrit V., Kohler C., “High-Performance Commercial Building Façades”, University of California, 2002 – Passe U., Battaglia F., “Designing Spaces for Natural Ventilation: An Architect's Guide”, Routledge, 2015 – Bauer M., Mösle P., Schwarz M., “Green Building – Guidebook for Sustainable Architecture”, Springer, 2009 – Davey P. (Ed). “Engineering for Finite Planet”, Birkhauser,2009 – Harris, J., Wigginton, M. “Intelligent Skin”, Oxford: Architectural Press, 2000. – Pinteric, M. Building Physics. Springer 2017, ISBN: 978-3-319-57483-7. – von Bockh, P., Wetzel, T. Heat Transfer, Basics and Practice. Springer 2012, ISBN: 978-3-642-19182-4. – Fabbri, K. Indoor Thermal Comfort Perception, ISBN: 978-3-319-18651-1. – Carlucci, S. Thermal Comfort Assessment of Buildings, ISBN: 978-88-470-5238-3.
Assessment	Individual assignments and group assignment in which 3-4 students are involved. Individual Assignments: 20% Individual overall participation: 10% Group project: 70%
Language	English