Course Catalog

Hellenic Mediterranean University

ATHENA
EUROPEAN UNIVERSITY

TABLE OF CONTENTS

13. Display Technologies
14. Organic Electronic Devices
15. Antennas and Wireless Communications
16. Satellite Communications and Systems
17. Scattering , Propagation and Radiation of Electromagnetic Waves
18. Electromagnetic Compatibility
19. Microwave Communications
20. Microwave Millimeter Wave Communications and Antennas

DEPARTMENT OF ACCOUNTING AND FINANCE

21. Financial Risk Management
22. Corporate Finance II
23. Derivatives Products and Hedging Techniques
24. Portfolio Management
25. Special Topics in Financial Management
26. Corporate Finance I

DEPARTMENT OF AGRICULTURE

27. Plant Anatomy & Morphology
28. Genetics
29. Plant Physiology
30. Soil Science

31. Field Crop Production I (Gramineae and Leguminosae)

32. Plant Breeding

33. Field Crop Production II (Industrial and Energy Crops)

34 .Introduction to Agricultural Sciences

35. Soil Microbiology

36. Sustainable Management of Biotic Resources in Agriculture

37. Apiculture

DEPARTMENT OF BUSINESS ADMINISTARION AND TOURSIM

38. Destination Branding

39. Statistics I

40.Food and Beverage Management

41.New Technologies in Marketing

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

42.Mechanical Design I

43.Heat Transfer II

44. Machine Dynamics and Vibration
45. Mechanical Drawing II

46. Mechanical Design II

47. Statistics and Probability

48. Mechanics II-Applied Dynamics
49. Programming for Engineers
50. Industrial Systems and Maintenance
51. Solar Radiation and Applications
52. Final Project Thesis

DEPARTMENT OF MUSIC TECHNOLOGY

53. Programming Environments for Sound and Music
54. Electroacoustics
55. Structured Programming
56. Selected Topics in Acoustics

NURSING

57. Nursing Practice in Hospital

NUTRITION AND DIETETICS

58. Nutrition and Metabolism II
59. Food Microbiology and Hygiene
60. Clinical Nutrition II
61. Nutritional Epidemiology
62. Environmental Resources and Food Production
63. Nutrition Research Methodology

DEPARTMENT OF SOCIAL WORK

64. Interpersonal Relationship and Well-Being
65. Field Practice – Supervision III
66. Domestic Violence and Social Work Practice

ATHENA
EUROPEAN UNIVERSITY

IRO-ACADEMY

International Relations Office
IRO-Academy

IRO-ACADEMY

The International Relations Office IRO-Academy, is the Academic Part of the office that offers Modules in English with Scientific and Cultural Research Topics to ***ALL Erasmus*** Students.

Students from **ALL Departments** could choose one or more of the lessons provided by our Office that they find interesting and/or important in order to satisfy completion of the studies and in order to complete the number of ECTS required for the Erasmus Program.

We are also pleased to offer lessons available online from our Partners in the ATHENA European University

The lessons provided by the HMU IRO-Academy are:

1) Soft and Research Skills Development

Course Code	ER0001
Course Title	Soft and Research Skills Development
ECTS	5
Tutor	Dr. Konstantinos Petridis cpetridis@hmu.gr
Prerequisite/ Corequisite	--
Semester	It is offered in both of the semesters
Objectives	Soft skills are a combination of people skills, social skills, communication skills, character or personality traits, attitudes, career attributes, social intelligence, and emotional intelligence that enable people to navigate their environment, work well with others, perform well, and achieve their goals with complementing hard skills. The Collins English Dictionary defines the term “soft skills” as “desirable qualities for certain forms of employment that do not depend on acquired knowledge: they include common sense, the ability to deal with people, and a positive flexible attitude.

	Research skills like Bibliographic research, Academic Writing, Poster Presentation, Promotion of your Research, Grant Writing, Interview Tips and Digital Skills are also important to be taught from the final undergraduate year of any discipline. The **objectives** of the course (offered for undergraduate and postgraduate students) are the following: Develop an understanding of the importance of soft & research skills including how soft & Research skills are: • Connected to technical or hard skills • Raise awareness amongst students, teachers, and professionals • Identify necessary soft skills depending on expertise • Assess how soft skills can be improved • Clarify and apply effective communication skills • Define and outline effective leadership skills including best practices • Examine and develop sense of self and culture • What are the Soft Skills a Scientist should have (Time Management, Problem Solving and Communication Skills) • How Research Skills are connected with your research and professional career
Intended Learning Outcomes	The Learning Outcomes of the Soft & Research Skills Development Module are the following: • to be able to provide an overview of the most wanted soft skills the labor market requires • to be able to apply the presented soft & research skills in her daily academic and research life • to be able to cope successfully in an interview process • to be able to analyze a complex problem into smaller units • to be able to present, negotiate and convince of her claims • to be able to write, submit and evaluate her work • to be able to communicate digitally and face to face communication • to be able to come back from fall back • to be able to adapt in any new professional or social environment
Indicative Syllabus	An indicative syllabus of the course follows: 1. Definition of Soft Skills & their Importance for Professional Development and Survival 2. Building Your Oral Presentation Skills

	3. Building Your Time Management Skills 4. Building Your Stress Management Skills 5. Building Your Critical Thinking Skills 6. Building Your Problem Solving Skills 7. Building Your Resilience Skills 8. Building Your Collaboration Skills 9. Building Your Adaptability Skills 10. Building Your Leadership Skills 11. Building Your Academic Writing Skills 12. How to Promote Your Research 13. How to Build Your Network and Write a Proposal 14. Building Your Interview Skills 15. Building Your Digital Skills 16. Building Your Digital Profile 17. How to use LinkedIn for your Career Development 18. Building Your Negotiation Skills 19. Building Your Motivation Skills 20. Building Your Emotional Intelligence Skills
Teaching/Learning Methodology	**Lectures (online, face to face):** Every week three hours **Seminars:** One seminar per two weeks where an external speaker interacts with our students in one of the aforementioned topics **Workshops**: Where students practice the soft skills are taught
Assessment Methods in Alignment with Intended Learning Outcomes	Final Test (70% of the overall grade) Presentations during the course (30% of the overall grade)
Students' Working Load	Lectures: 36 hrs Homework/Study Time 108 hrs Seminars: 12 hrs

	In total 156 hours → 5ECTS
Reading List and References	• Lecture's Notes • Mindtools (https://www.mindtools.com/) • Harvard Business Review Journal (https://hbr.org/) • Coursera (https://www.coursera.org/) • EdX (https://www.edx.org/)

2) PROJECT MANAGEMENT

Course Code	ER 0007
Course Title	Project Management
ECTS	5
Prerequisite/ Corequisite	--
Semester	2nd (spring)
Tutor	Dr. Tomaz Aljaz from University FINI Slovenia
Objectives	The **Project management** aims to utilize understanding the principles and practices of project management in the area of digitalization. The students will learn and understand the strengths and drawbacks of project management. The main goal is to improve the effectiveness of the students in project management: from initiation to day-to-day activities, including skills and competences of the project manager, to manage, plan, monitor, and control projects of various types.
Intended Learning Outcomes	Knowledge and understanding: • Foundations of project management and its importance to the success of projects • Understand the process of managing projects, including project plan, human behavior, interdependencies, rules and measurement. • Effectively apply learned concepts (e.g., CCPM, Scrum) in day-to-day environment.
Indicative Syllabus	• Introduction of Project management • Traditional way of managing projects / V-model • Limitation of traditional project management principles • Ensuring stability, predictability and reliability of deliverables

	• Reducing time needed for finishing tasks and work in progress • Agile Project management • Critical Chain Project Management • Scrum • Project lifecycle • Case study
Teaching/Learning Methodology	• Lectures with active student participation (explanation, discussions, questions, examples and problem-solving). • Homework related to personal or working environment (reflecting personal experience, project work, teamwork, methods of critical judgement, discussions, giving feedback, and educational games). • Experimental exercises that are based on experience, cooperation and problem learning (independent study, discussions, explanation, observation, teamwork, case study, method of critical reading and writing, role play, collaborative learning, evaluation, self-evaluation).
Assessment Methods in Alignment with Intended Learning Outcomes	Weekly homework: 100%
Students' Working Load	Tutorials 36 hrs Homework 36 hrs Self study 72 hrs In total 144 hours → 5ECTS
Reading List and References	• Meredith, R. J. in Mantel, S. J. (2000): Project Management, 4th ed, John Wiley & Sons, Inc. • Lewis, J. P. (2006): Fundamentals of Project Management. American Management Association. • Eliyahu M. Goldratt. The Goal: A Process of Ongoing Improvement, Gower Publishing Ltd; 30th Anniversary Edition, 2012 • Eliyahu M. Goldratt. Critical Chain. 1997 • Rob Newbold. Project Management in the Fast Lane, 1998 • Eliyahu M. Goldratt. Production the TOC Way with CD simulator • Kent Beck, Cynthia Andreas. Extreme Programming Explained: Embrace Change 2nd Edition, 2004 • Ken Schwaber and Jeff Sutherland: The Scrum Guide,2020

3) European Economics

Course Code	ER 0008
Course Title	European Economics
ECTS	2
Prerequisite/ Corequisite	Prior exposure to microeconomics, macroeconomics and international economics is a plus.
Semester	spring
Tutor	Prof. Dr. Camélia Turcu, University of Orléans
Objectives	This is an introductory course to the economics of the European integration. The course has two objectives: (i) to improve your knowledge about European economics, in general (ii) to increase your ability to analyze economic policy questions related to European integration, European Union (EU) enlargement, or the impact of Brexit and Covid-19 on the EU.
Assessment Methods in Alignment with Intended Learning Outcomes	Lecture 1. European history, facts and institutions Lecture 2. Trade, firms location and labor migration in the enlarged EU Lecture 3. European monetary integration Lecture 4. EU macroeconomic policies Lecture 5. From one crisis to another: the European responses
Reading List and References	Badinger H. and V. Nitsch (2015), Handbook on the Economics of European Integration, Routledge Baldwin R. and Ch. Wyplosz (2022), The Economics of European Integration, 7th edition, McGraw-Hill Hare P. and R. Turley (2013), Handbook of the Economics and Political Economy of Transition, Routledge

4) Introduction to History of Crete and GREECE

Course Code	ER 0003
Course Title	INTRODUCTION TO HISTORY OF CRETE & GREECE
ECTS	3
Level of Studies	Undergraduate
Tutor	Dr. Petridis Konstadinos
E-mail	cpetridis@hmu.gr
Brief Description	a) Cretan and Hellenic Mythology, b) Cretan History – Minoan, c) Cretan History – Hellenic, Roman, Byzantine, Arabic, Venetian, Turkish and 20th Century. d) Hellenic History e.g. Classical Athens and Democracy, Delphi and Religion, Epidaurus and Theatre, Olympic Games, Macedonia and Alexander the Great etc. and Roman, Byzantine, Turkish and 19th-20th Century. e) Cretan Culture and Tradition. f) Study Trips to Museums, Archaeological Sites and Places of Interest.
Learning Outcomes	To acquaint the visiting European Students (ERASMUS+) with the rich history, language, culture and civilization of Crete and Hellas
Prerequisites	Students could manage to obtain ENGLISH LANGUAGE B2
Assessment	Written Assignment (3000 Words in English) on a mutually agreed research project on an aspect of Cretan Culture, or a Certificate of Attendance will be awarded.
Recommended Literature	http://history.heraklion.gr/background.php?url=index&id=&cat=&open=&lang=441&chron= and https://www.teicrete.gr/daidalika/ and Supplementary Material

5) Modern Greek Language

Course Code	**ER 0006**
Course Title	**MODERN GREEK LANGUAGE**
ECTS	2
Level of Studies	Undergraduate
Tutor	Dr. Gareth Owens
E-mail	ogareth@hmu.gr
Brief Description	• Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. • Can introduce themselves and others and can ask and answer questions about personal details such as where they live, people they know and things they have. • Can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.
Learning Outcomes	A1 Breakthrough or beginner
Prerequisites	ENGLISH LANGUAGE B2
Assessment	Written Examination and Class Contribution and Lesson Participation
Recommended Literature	Kleanthes & Frossos Arvantakis, Communicate in Greek for Beginners, Course Book + Audio CD, Deltos Publishing, First Edition July 2010, Reprinted September 2014. Kleanthes & Frossos Arvantakis, Communicate in Greek for Beginners, Workbook One, Deltos Publishing, First Edition July 2010, and Supplementary Material

DEPARTMENT OF ELECTRONIC ENGINEERING

CHANIA

DEPARTMENT OF ELECTRONIC ENGINEERING

CHANIA

YEAR 2022-2023

ELECTRONIC ENGINEERING - CHANIA				
COURSE TITLE	INSTRUCTOR	STUDY LEVEL	SEMESTER	ECTS
Structured Programming	N.Petrakis nik.s.petrakis@hmu.gr or new lecturer	Bachelor	W	5
Data Structures	N.Petrakis nik.s.petrakis@hmu.gr	Bachelor	S	5
Digital Image Processing	A. Konstantaras akonstantaras@hmu.gr	Bachelor	W/S	5
Power Electronics	I.Chatzakis jchatzakis@hmu.gr	Bachelor or Master	W/S	4
Automatic Control Systems	G.Fouskitakis fouskit@hmu.gr	Bachelor	W/S	4
An Introduction to Laser Physics and Applications	K.Petridis cpetridis@hmu.gr	Bachelor	W/S	5
Soft and Research Skills Development	K.Petridis cpetridis@hmu.gr	Bachelor	W/S	5

An Introduction to Optoelectronics & Optical Communications	K.Petridis cpetridis@hmu.gr	Bachelor	S	5
^Algorithms and Complexity	M. Zakynthinaki, marzak@hmu.gr	Bachelor or Master	W	5
Information Systems Analysis and Design	M. Zakynthinaki, marzak@hmu.gr	Bachelor	S	5
^Differential Equations and Computational Algorithms	M. Zakynthinaki, marzak@hmu.gr	Bachelor	S	5
Introduction to Plasma Engineering	I.Fitilis fitilis@hmu.gr	3rd Year and above	W/S	4
Display Technologies	I.Kaliakatsos giankal@hmu.gr	≥ 4th semester	W/S	4
Organic Electronics Devices	I.Kaliakatsos giankal@hmu.gr	≥ 4th semester	W/S	4
Antennas and Wireless Communications	I.Vardiambasis ivardia@hmu.gr	3rd Year and above	W	4
Satellite Communications and Systems	I.Vardiambasis ivardia@hmu.gr	3rd Year and above	W	4
Scattering, Propagation & Radiation of Electromagnetic Waves	I.Vardiambasis ivardia@hmu.gr	4th Year and above	W	4
Electromagnetic Compatibility	I.Vardiambasis ivardia@hmu.gr	3rd Year and above	S	4
Microwave Communications	I.Vardiambasis ivardia@hmu.gr	3rd Year and above	S	4

Microwave-Millimeter Wave Communications & Antennas	I.Vardiambasis ivardia@hmu.gr	4th Year and above	S	4

^ These courses are provided from non-permanent personnel and may will not be offered (changes can be made the first week of the semester)

Diploma Thesis (6 months)

Diploma Thesis Title	Positions	Study Level	Semester	Professor	Online
"Solving electromagnetic wave propagation, radiation and scattering problems using computational techniques"	1	Bachelor or Master	W/S	I.Vardiambasis ivardia@hmu.gr	
"Telecommunication systems design and development using FPGA technology"	1	Bachelor or Master	W/S	I.Vardiambasis ivardia@hmu.gr	

>>*Other diploma thesis could be suggested upon request*

Training/Practice (6 –months)

Description of Training/practice	Positions	Semester	Professor	Online
"Training in the Telecommunications and Electromagnetic Applications Laboratory (Mat lab programming, electromagnetic simulation software authoring, boundary value problems solving, electromagnetic field measurements, analysis, design and development of microwave devices and antennas)" (Needed :Adequate background in	1	W/S	I.Vardiambasis ivardia@hmu.gr	

telecommunications and/or electromagnetics, Proficient use of Mat lab programming)				

Structured Programming	
Dr. Eng. Nikolaos Petrakis	nik.s.petrakis@hmu.gr or new lecturer
Bachelor	
5	
None	
The course is an introduction to structured programming using the C programming language, where the student will start with the basic concepts of variable, data type, loop and will continue learning to structure his code correctly in functions. Upon successful completion of the course the student will be able to: ✓ find/discover solutions to problems of moderate difficulty, to describe the algorithmic solutions in pseudo-code and / or in a flowchart, and of course to be able to encode them. ✓ evaluate algorithmic solutions. ✓ design and implement software applications that provide access to text files. ✓ design and write code for programs that require the use of vectors or arrays composed of structure type elements. ✓ use sorting and/or searching techniques as appropriate.	

- Introduction to Informatics and Computers.
- Computer parts (hardware). Computer programs (software).
- Numbering systems and conversions from one system to another.
- The concept of the algorithm. Algorithm structures. Flowcharts.
- Programming in C language. Data types. Variables. Constants. Strings.
- Control statements. Operators (arithmetic, relational, logical, bitwise, etc).
- Loop control statements. Functions and building blocks of the program.
- One-dimensional / multidimensional arrays. Pointers. Recursion and recursive functions.
- Structures and unions (defining/accessing).
- Introduction to searching (Sequential Search, Binary Search) and sorting techniques (Sort by Selection, Bubble Sort).
- Using real files (text streams).
- Learn basic program design and implementation principles in the Dev-C ++ or CODE :: BLOCKS or MS Visual Studio environment.

Weekly Lectures 5hr/week *(if the number of students is greater than 4), else project based*

Written exams, class contribution, delivery of small individual projects every two weeks

1. H.H.Tan, T.B. D'Orazio, C Programming for Engineering & Computer Science, McGraw-Hill, 2000.
2. H. M. Deitel, P. J. Deitel, C: How to program, (second edition), Prentice-Hall, 1999.
3. Brian Kernigham, Dennis Ritchie, The C Programming Language, (second edition), Prentice-Hall, 1988.
4. Herbert Schildt, C The Complete Reference, Osborn/McGraw-Hill, 1987.
5. A. Tenenbaum,Y. Langsam, M. Augenstein, Data Structures Using C, Prentice-Hall, 1990.
6. Herbert Schildt, C The Complete Reference, Osborn/McGraw-Hill, 1987.

Course Title	Data Structures
Instructor	Dr. Eng. Nikolaos Petrakis nik.s.petrakis@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	Basic knowledge of Computer Programming using C.
Learning Outcomes	The course is an introduction to algorithms and data structures, using as a tool a programming language such as C / C ++, where the student will start with the basic concepts and terminology and will continue learning to design, implement and evaluate the solutions. Upon successful completion of the course the student will be able to: ✓ mention and describe the characteristics of the basic data structures. ✓ mention and describe the basic algorithms for searching and sorting data (internal and external). ✓ mention and describe binary trees traversal methods. ✓ mention basic algorithms in Graphs. ✓ analyze a complex problem and design the solution on an abstract level. ✓ analyze the quality of a solution in relation to the execution time of its individual procedures. ✓ Tcompose the solution of a problem based on the individual parts of the solution. ✓ check the correctness of a solution and to evaluate the various alternative solutions to a problem. ✓ Eevaluate both the quality of the design and the implementation of the solution of a problem. ✓ modify known algorithms so that they can be better utilized in solving a problem. ✓ evaluate the algorithmic solutions in relation to the execution time of the respective algorithm. ✓ design and write code for programs that require the use of data structures. ✓ use the most appropriate sorting or searching technique taking into account the expected distribution of data. ✓ find solutions to complex problems, to describe its algorithmic solutions in pseudo-code and / or in a flowchart, and of course to be able to encode them.
Contents	• Introduction to the basic concepts of data structures and algorithms. • Accessing sequential files. Define new type or variable as a data union. • Arrays, linearization of multidimensional arrays. • Stacks. Define the most important operations that can be performed in a stack, implemented using either static or dynamic data types.

	• Queues and fundamental operations that can be defined in a queue. Queue implementation with circular array (static) and queue implementation with nodes (dynamic). • Singly linked lists. Doubly linked lists and function definitions for basic operations. • Two-way interconnection technique using just a single link. • Trees. Binary tree traversal methods. Binary search trees. Balanced search trees. • Design and implementation of appropriate data structures for specific programming problems. • Evaluation of different data structures. • Straight sorting methods: sort by selection, shaker sort and bubble sort. • Quick sort technique. Sort variable-length sequences. • Sorting files using natural merge sort. Sequential search. Binary search. • Performance and analysis of algorithms. Time complexity. Algorithm performance comparison. • Graphs. • Learn software design and implementation principles in the Dev-C ++ or CODE :: BLOCKS or MS Visual Studio environment.
Course type	Weekly Lectures 5hr/week *(if the number of students is greater than 4), else project based*
Assessment	Written exams, class contribution, delivery of small individual projects every two weeks.
Bibliography	1. Leendert Ammeraal, Programs and data structures in C, John Wiley & Sons Ltd, 1987. 2. H.H.Tan, T.B. D'Orazio, C Programming for Engineering & Computer Science, McGraw-Hill, 2000. 3. H. M. Deitel, P. J. Deitel, C: How to program, (second edition), Prentice-Hall, 1999. 4. A. Tenenbaum,Y. Langsam, M. Augenstein, Data Structures Using C, Prentice-Hall, 1990. 5. A. Aho, J. Hopcroft, J. Ullman, The Design and Analysis of Computer Algorithms", Addison-Wesley Publishing Company, 1974.

Course Title	Digital Image Processing
Instructor	Dr. Antonios Konstataras akonstantaras@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	None
Learning Outcomes	The basic concepts and algorithms applied to image processing systems and graphics cards are presented, while providing examples that allow students to become familiar with them, as well as technical computing tools in Matlab and CUDA. Students who have successfully completed the course will have a good understanding and knowledge of the main concepts, algorithms, and tools in the field of digital image processing and will have implemented applications in actual systems.
Contents	Image fundamentals, image enhancement in the spatial and frequency domains, restoration, color image processing, wavelets, image compression, morphology, segmentation, image description, and the fundamentals of object recognition.
Course type	Weekly meetings, project and lecture based
Assessment	
Bibliography	1. Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, Prentice Hall, 2008. 2. Rafael C. Gonzalez, Richard E. Woods and Steven Eddins, “Digital Image Processing Using Matlab”, McGraw Hill Education, 2010.

Course Title	Power Electronics
Instructor	Dr. John Chatzakis, jchatzakis@hmu.gr
Study level	Bachelor
ECTS	4
Prerequisite	Fundamental Analog Electronics
Learning Outcomes	Knowledge: After completing the course, the student will: ✓ have an in-depth understanding of the role of Power Electronics to electrical energy conversion as AC/DC, DC/DC or DC/AC and AC/AC conversion. ✓ understand operating principles and modulation strategies for basic Power Electronics Topologies and the properties of several PWM techniques and their applications to switch-mode power electronic systems. ✓ be able to identify the most important design parameters and to recognize the impact of operating parameters on the design and use of power electronic devices Skills: After conclusion of the course, the student will be able to: ✓ recognize, define, and analyze power electronic converters that perform AC/DC, DC/DC, DC/AC and AC/AC conversions ✓ design power electronic converters exhibiting high-performance operation ✓ analyse the operating principles and modulation for power electronic systems Competences: After completing the course, the candidate has increased: ✓ skills in cooperation - ability to communicate effectively about the Power Electronic Systems ✓ ability to contribute to innovation and innovation processes
Contents	• Definition of "Power Electronics", Semiconductors (Si, SiC, GaN) and Power Semiconductor Devices and Components, (Diode, Thyristor, GTO, MCT, TRIAC, Power BJT, Power MOSFETs, SJ MOSFET, IGBT, HEMT, TRIAC), Circuits with switches and diodes (with load RC, RL, RLC), semiconductor protection, damping • oscillations - snubbers, MOVs, fuses, current sensing protection - protection through the drive circuit. Rectifiers, multiphase rectifiers, controlled rectifiers with thyristor. • RL and LC low-pass filters, Fourier analysis, harmonics spectrum use, ripple coefficient (K), total harmonic distortion factor (THD), harmonic coefficients (HF 1,2), power factor (PF). DC / DC conversion, buck converter, CCM and DCM operation, Boost converter, positive to negative converter. Duty Cycle Definition and Control using Pulse Width Modulation (PWM). • Switching Power Supplies, power factor correction (PFC), pulse transformer, Forward Converter, semi-bridge, Full Bridge, Push-Pull, coupled coils, Flyback converter. Inverters: Half Bridge, Bridge, PWM Technique, MPWM Technique, Technique PDM,

	Modulation Factor (Mf), SPWM Technique, Normal Carrier Frequency (Fnc), HF-Link, Three Phase Inverters, Inverters and Motor Drive, Class D amplifiers. • Class E, Cycloconverters. • MCUs, DSPs and Power Electronics, Digital PWM Units. • MPPT, PFC, Batteries and Battery Management.
Course type	Weekly Lectures 2hr/week
Assessment	Written exams, class contribution, short project presentation.
Bibliography	1. Ned Mohan, Tore M. Undeland, William P. Robbins, “Power Electronics: Converters, Applications, and Design”, Whiley, 2002. 2. S. N. MANIAS, «POWER ELECTRONICS», SIMEON PUBLICATIONS, ATHENS 2012.

Course Title	An Introduction to Laser Physics and Applications
Instructor	Dr. Kostas Petridis cpetridis@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	None
Objectives	Light Amplification by Stimulated Emission of Radiation – LASERS introduced to the scientific community in 1958 (as a theoretical concept) and in 1960's as an operational device. Since then more than 33 Nobel Prizes in Physics have been awarded for works directly related to LASER Technology (with the last one in 2018). Today there is no activity that does not involve Laser light The objectives of the course (offered for undergraduate and postgraduate students) are the following: • Develop an understanding of the special properties of laser light; monochromaticity, directionality, spatial & temporal coherence • To offer the understanding of the building blocks of a laser device • Develop the understanding of the operational principles of a laser device: (a) Threshold Level; (b)Small Gain Coefficient; (c) Gain Saturation; (d) Steady State Condition Operation; (e) Spectral Broadening; (f) Laser Beam Propagation through vacuum and through optical elements; and (g) Pulsed Operation • The Introduction of various Laser Systems • The Introduction of various Laser Applications
Intended Learning Outcomes	The Learning Outcomes of the module 'An Introduction to Laser Physics and Applications' are the following: • to be able to explain how does a laser device operate • to be able to design a laser system • to be able to calculate various parameters related to a laser configuration: laser beam size, laser intensity, tunning range
Indicative Syllabus	An indicative syllabus of the course follows: 21. An Introduction of Lasers & Applications

	22. The Light Matter Interaction Processes, the Einstein Rate Equations and the requested Population Inversion 23. The Electron Harmonic Oscillator Model 24. The Small Gain Coefficient & Related Losses 25. The Pumping Schemes 26. The Role of the Optical Oscillator 27. The Broadening Mechanisms: Homogeneous and Inhomogeneous Broadening 28. Longitudinal & Transverse Laser Modes 29. The Gain Saturation (Spatial Hole Burning and the Lamb Deep) 30. Tunable Laser Systems 31. Gaussian Beams and the ABCD Matrix Method 32. Generation of Laser Pulses: The Q-Switching Method 33. Generation of Laser Pulses: The Mode Locking Technique 34. Modern Laser Systems I 35. Modern Laser Systems II 36. Laser Applications in Medicine 37. Laser Applications in Nanoelectronics 38. Laser Applications in Energy Generation: Laser Fusion 39. Laser Applications in Engineering: Laser 3D Printing and Laser Biomimetics 40. Laser Applications in Optical Communications
Teaching/Learning Methodology	**Lectures (online, face to face):** Every week three hours **Seminars:** One seminar per two weeks where an external/invited speakers interacts with our students in Laser Applications
Assessment Methods in Alignment with Intended Learning	Final Test (70% of the overall grade) Presentations during the course (30% of the overall grade)

Outcomes	
Students' Working Load	Lectures: 36 hrs Homework/Study Time 108 hrs Seminars: 12 hrs In total 156 hours → 5ECTS
Reading List and References	• Lecture's Notes • Principles of Lasers by O. Svelto • Fundamentals of LASERS by Silfast

Course Title	Automatic Control Systems
Instructor	Assoc. Prof. G. Fouskitakis, e-mail: fouskit@hmu.gr
Study level	2nd year - Spring semester
ECTS	4
Prerequisite	Mathematics 1, Signals & Systems
Learning Outcomes	The aim of the course is to obtain the theoretical and practical background in Automatic Control Systems in both the continuous and digital time as well as their applications. The course aims to introduce students to the basic concepts of Automated Control Systems. Upon successful completion of the course the student will be able to: o Mathematically represent a dynamic system via its transfer function. o Analyze – utilizing its transfer function – the behavior of a dynamic system. o Define a set of desired control system properties. o Design closed-loop control systems. o Appropriately tune PID controllers to match the desired closed-loop control system's properties. o Analytically design closed-loop control systems. Evaluate the closed-loop control system's steady-state errors and its "type".
Contents	Representation of dynamical systems with transfer functions. System analysis in both the time and the frequency domains. Stability analysis. Block diagram algebra. Closed-loop control systems. PID controllers. PID tuning via the empirical Ziegler-Nichols method. Simulation of closed-loop control systems Closed-loop control system design via the pole placement method. Evaluation of steady-state errors. Evaluation of the closed-loop control system "type".

Teaching Methodology	Project and biweekly meetings
Assessment	Project and sets of exercises
Bibliography	• B. Kuo, "*Automatic Control Sytems*", 7th Edition, Prentice Hall, 1994. • R. Dorf, "*Modern Control Systems*", 13th Edition, Pearson Editions, 2016. • J. Distefano, A. R. Stubberud and I. J. Williams, "*Schaum's Outline of Feedback and Control Systems*", 2nd Edition, McGraw-Hill Education, 2013. • N. S. Nise, "*Control Systems Engineering*", 8th Edition, John Wiley & Sons, 2019. P. N. Paraskevopoulos, "*Digital Control Systems*", 1st Edition, Prentice Hall, 1996.

Course Title	Soft and Research Skills Development
Instructor	Asc. Prof. Kostas Petridis cpetridis@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	None
Objectives	Soft skills are a combination of people skills, social skills, communication skills, character or personality traits, attitudes, career attributes, social intelligence, and emotional intelligence that enable people to navigate their environment, work well with others, perform well, and achieve their goals with complementing hard skills. The Collins English Dictionary defines the term “soft skills” as “desirable qualities for certain forms of employment that do not depend on acquired knowledge: they include common sense, the ability to deal with people, and a positive flexible attitude Research skills like Bibliographic research, Academic Writing, Poster Presentation, Promotion of your Research, Grant Writing, Interview Tips and Digital Skills are also important to be taught from the final undergraduate year of any discipline. The objectives of the course (offered for undergraduate and postgraduate students) are the following: Develop an understanding of the importance of soft & research skills including how soft & Research skills are: • Connected to technical or hard skills • Raise awareness amongst students, teachers, and professionals • Identify necessary soft skills depending on expertise • Assess how soft skills can be improved • Clarify and apply effective communication skills • Define and outline effective leadership skills including best practices • Examine and develop sense of self and culture • What are the Soft Skills a Scientist should have (Time Management, Problem Solving and Communication Skills) • How Research Skills are connected with your research and professional career
Intended Learning	The Learning Outcomes of the Soft & Research Skills Development Module are the following:

Outcomes	• to be able to provide an overview of the most wanted soft skills the labor market requires • to be able to apply the presented soft & research skills in her daily academic and research life • to be able to cope successfully in an interview process • to be able to analyze a complex problem into smaller units • to be able to present, negotiate and convince of her claims • to be able to write, submit and evaluate her work • to be able to communicate digitally and face to face communication • to be able to come back from fall back • to be able to adapt in any new professional or social environment
Indicative Syllabus	An indicative syllabus of the course follows: 1. Definition of Soft Skills & their Importance for Professional Development and Survival 2. Building Your Oral Presentation Skills 3. Building Your Time Management Skills 4. Building Your Stress Management Skills 5. Building Your Critical Thinking Skills 6. Building Your Problem Solving Skills 7. Building Your Resilience Skills 8. Building Your Collaboration Skills 9. Building Your Adaptability Skills 10. Building Your Leadership Skills 11. Building Your Academic Writing Skills 12. How to Promote Your Research 13. How to Build Your Network and Write a Proposal 14. Building Your Interview Skills 15. Building Your Digital Skills 16. Building Your Digital Profile 17. How to use LinkedIn for your Career Development 18. Building Your Negotiation Skills

	19. Building Your Motivation Skills 20. Building Your Emotional Intelligence Skills
Teaching/Learning Methodology	**Lectures (online, face to face):** Every week three hours **Seminars:** One seminar per two weeks where an external speaker interacts with our students in one of the aforementioned topics **Workshops:** Where students practice the soft skills are taught
Assessment Methods in Alignment with Intended Learning Outcomes	Final Test (70% of the overall grade) Presentations during the course (30% of the overall grade)
Students' Working Load	Lectures: 36 hrs Homework/Study Time 108 hrs Seminars: 12 hrs In total 156 hours → 5ECTS
Reading List and References	• Lecture's Notes • Mindtools (https://www.mindtools.com/) • Harvard Business Review Journal (https://hbr.org/) • Coursera (https://www.coursera.org/) • EdX (https://www.edx.org/)

Course Title	Information Systems Analysis and Design
Instructor	Dr. Maria Zakynthinaki e-mail: marzak@hmu.gr
Study level	Bachelor or Master Semester: Spring
ECTS	5
Prerequisite	--
Learning Outcomes	Basic concepts of IS Methods of information and requirement gathering IS models by use of techniques such as Data Flowcharts, Entity-Relationship Diagrams, UML Diagrams, etc. IS Design (OO approach). IS security and control checks. Basic Python OOP.
Contents	The course deals with planning the development of information systems through understanding and specifying what a system should do and how the components of the system should be implemented and work together. We will go through the concepts, skills, methodologies, techniques, tools, and perspectives essential for systems analysts. We will study the model of entity relationships and consider the use of UML as a modelling language. The practical component of the course is object oriented and use-case driven. Examples of real-life systems will be constructed and implemented by use of Python and Object Oriented Programming.
Course type	Weekly Lectures 4hr/week (3 theory, 1 programming)
Assessment	Written exams, weekly assessments, final project in Python.
Bibliography	▪ Kendall and Kendall, System analysis and design, Pearson, 2019. ▪ Curtis G., Cobham D.P., Business Information Systems: Analysis, Design and Practice, Pearson Education, 2008. ▪ Halpin T., Morgan T., Information Modeling and Relational Databases: From Conceptual Analysis to Logical Design, Morgan Kaufmann, 2008. ▪ D. Avison, G. Fitzgerald, Methodologies for developing Information Systems: A historical perspective, 2006.

Course Title	An Introduction to Optoelectronics & Optical Communications
Instructor	Dr. Kostas Petridis cpetridis@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	None
Objectives	**Optical communications** are the dominant means of information transmission in the world. Even though the physical limitations of electrical cable prevent speeds in excess of 10 Gigabits per second, the physical limitations of fiber optics have not yet been reached. Everyday life applications such as broadband internet, cable HD TV, telemedicine, YouTube, online gaming and cloud based services like e-banking, Facebook and Twitter, owe their existence to the vast bandwidth capacity of the currently deployed global optical communication system. Optical communications to address limitations of radio frequency (RF) communications, including: bandwidth, spectrum and overall size of frequency packages and power used. **Optical spectrum** uses light as a means of transmitting information via lasers. **Optical communications** benefits include being faster, more secure, lighter and more flexible. The **objectives** of the course (offered for undergraduate and postgraduate students) are the following: • Realise the different technologies involved within the Optical Communication Technologies • Understand the operational principles of the various optoelectronic systems are involved in an optical communications network • To be aware of the new concepts of optical communications in the fields of optical networking and 5G Communications
Intended Learning Outcomes	The Learning Outcomes of the module 'An Introduction to Optoelectronics and Optical Communications' are the following: • to be able to understand the concepts of laser operation • to be able to understand the concepts of laser pulsed operation • to be able to understand the various laser pulses modulation schemes • to be able to explain the operation of an optical fiber • to be able to calculate the dispersion of a laser pulse within an optical fiber

	• to be able to calculate the various losses within a waveguide • to be able to design an optical network system
Indicative Syllabus	An indicative syllabus of the course follows: 41. An Introduction to Lasers 42. The Lorentz Principle 43. The Einstein Rate Equations 44. Broadening Mechanisms 45. The Resonator Principle 46. Gaussian Optics 47. The Semiconductor Laser Systems 48. Generation of Laser Pulses 49. Characterization of Laser Pulses 50. Frequency and Amplitude Modulation of Laser Pulses 51. The Fiber Optic Concept 52. The Wave Propagation in vacuum and in waveguides 53. The EDFA concept 54. Optoelectronic Devices for Optical Communications 55. The Dispersion issue within optical fibers – solutions 56. Wavelength Dispersion Multiplexing 57. Optical Technologies for networking 58. Optical Technologies for Access Network 59. Optical Technologies for 5G Networking 60. Optical Technologies for Data Center Networking
Teaching/Learning Methodology	**Lectures (online, face to face):** Every week three hours

	Seminars: One seminar per two weeks where an external/invited speakers interacts with our students in Optical Communications
Assessment Methods in Alignment with Intended Learning Outcomes	Final Test (70% of the overall grade) Presentations during the course (30% of the overall grade)
Students' Working Load	Lectures: 36 hrs Homework/Study Time 108 hrs Seminars: 12 hrs In total 156 hours → 5ECTS
Reading List and References	• Lecture's Notes • Suggested Bibliography

Course Title	Algorithms and Complexity
Instructor	Dr. Maria Zakynthinaki marzak@hmu.gr
Study level	Bachelor or Master
ECTS	5
Prerequisite	Basic knowledge of the mathematical method of reduction. Knowledge of programming.
Learning Outcomes	The course provides an introduction to differential equations, specially designed for electronic engineers. Topics also include numerical techniques for the solution of initial value problems.
Contents	• What is an algorithm? The concept of complexity. • Iterative and recursive algorithms • Greedy algorithms • Divide and Conquer • Sorting • Searching • Random number generation • Linear programming • Dynamic programming • NP completeness. Reductions
Course type	Weekly Lectures 4hr/week (3 theory, 1 programming)
Assessment	Written exams, weekly assessments, final project in Python.
Bibliography	1. The Algorithm Design Manual, S.S. Skiena, 2nd ed., Springer-Verlag,2008 2. Introduction to the Design and Analysis of Algorithms (3rd Edition) 3rd Edition, 3. Anany Levitin, 2012 4. Introduction to Algorithms, T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein, S.S. Skiena, 3rd ed., The MIT Press, 2009

Course Title	Differential Equations and Computational Algorithms
Instructor	Dr. Maria Zakynthinaki marzak@hmu.gr
Study level	Bachelor
ECTS	5
Prerequisite	Basic knowledge of differentiation and integration techniques.
Learning Outcomes	The course provides an introduction to differential equations, specially designed for electronic engineers. Topics also include numerical techniques for the solution of initial value problems.
Contents	• First order ODEs, method of variable separation • Gradient, divergence and curl. Laplacian • First order nonhomogeneous ODEs. Method of undetermined coefficients • Applications of first order ODEs to practical problems in mechanical and electrical engineering • ODEs of order >1, method of variable separation • Second order linear homogeneous ODEs with constant coefficients • Second order nonhomogeneous ODEs with constant coefficients. Method of undetermined coefficients • Applications of second order ODEs with constant coefficients to practical problems • N-th order linear homogeneous and nonhomogeneous ODEs with constant coefficients • Second order linear homogeneous ODEs with constant coefficients - The Laplace transform method • Numerical solution of first order initial value problems. Euler, and RK methods
Course type	Weekly Lectures 4hr/week (3 theory, 1 tutorial)
Assessment	Written exams, weekly assessments.
Bibliography	1. C.H. Edwards, Jr., David E. Penney, *Elementary Dfifferential Equations with Applications (Third Edition),* Prentice-Hall, Englewood Cliffs, NJ, 1996. 2. Chapra, S. C., & Canale, R. P. (2006). *Numerical methods for engineers*. Boston: McGraw-Hill Higher Education.

Course Title	Introduction to Plasma Engineering
Instructor	Dr. Ioannis Fitilis fitilis@hmu.gr
Study level	Bachelor 3nd year or Master
ECTS	4
Prerequisite	Basic knowledge of electromagnetism and optics (Lorentz force, e/m waves formalism, Maxwell equations, dielectric\magnetic constant, refractive index, refraction, etc.)
Learning Outcomes	The course introduces the students to the fundamental of plasma and the applications of plasma technology. After completing the course, the student will be able to: ✓ understand the plasma phase of the matter, the unique properties it has and the different types of plasmas. ✓ calculate/evaluate basic plasma parameters ✓ mention the different formulations of plasma description and where could be applied ✓ recognize the different type of waves that could develop/propagate in plasmas and their properties ✓ have knowledge of the different technologies of plasma sources and their properties ✓ describe various plasma applications and choose the proper plasma sources ✓ use proper diagnostics for plasma sources characterization ✓ mention and describe the various type of dense plasma generators and their applications.
Contents	• Introduction to plasma: definitions, properties, Debye shielding, temperatures- densities, types of plasmas, plasma frequency. • Plasma descriptions: particle motion, kinetic description, two-fluid description, magneto-hydrodynamic (MHD) description, ideal-MHD, plasma conductivity. • Waves in plasma: waves in non-magnetized plasma, phase velocity, refractive index, critical density. Waves in magnetized plasma, cutoff-resonance, MHD waves. • Plasma sources: electric discharge tubes, plasma torch, corona discharge, Dielectric Barrier discharge, RF discharge, Microwave discharge. Electron beam plasmas. Laser plasmas. • Plasma applications: Material processing, nanolithography, plasma antennas, plasma monitor, plasma thrusters, spectroscopy, sterilization, • Plasma diagnostics: diagnostics of magnetic field, current, particle flow, refractive index, spectroscopy. Diagnostics with X-rays, ion beam. • Dense plasma & applications: pulsed power plasma devices. Z-pinch, plasma instabilities, X-pinch & other pinch configurations, Dense Plasma Focus, Tokamak, Stellarator. high photon energy sources, particle acceleration, fusion energy.

Course type	Weekly Lectures 2hr/week
Assessment	Written exams 60%, class contribution 20%, short project presentation 20%.
Bibliography	1. Introduction to Plasma Technology: Science, Engineering and Applications Dr. John Ernest Harry, 2010, Wiley-VCH ISBN Print:9783527327638 Online:9783527632169 2. Plasma Physics and Engineering, A. Fridman, L. A. Kennedy, 2011, CRC Press ISBN 9781439812280 3. Plasma Engineering: Applications from Aerospace to Bio and Nanotechnology, 1st edition (or 2nd edition), M. Keidar , I. Beilis, 2013 (2018), Academic Press ISBN: 978-0123859778 (978-0128137024) 4. Principles of Plasma Physics for Engineers and Scientists, U. S. Inan, M. Gołkowski, 2011, Cambridge University Press ISBN 13:9780521193726

Course Title	Display Technologies
Instructor	Dr. Ioannis.Kaliakatsos giankal@hmu.gr
Study level	≥4 semester
ECTS	4
Prerequisite	Electronic Devices and Circuits
Objectives	The class examines the fundamentals of 2D and 3D display technologies (e.g. human visual system, color and depth perception, color theory and metrology, and state-of-the-art display technologies), display performance evaluation and calibration, and display research frontiers. The class is suited for both graduate and undergraduate students. You are encouraged to talk to the Instructor to find out if this is the right course for you.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: ✓ Understand Anatomy of Eye, Light Detection and Sensitivity, Spatial Vision and Pattern Perception, Binocular Vision and Depth Perception. ✓ Understand Photolithography for Thin Film LCD, Wet Etching, Dry Etching; Flexible Displays. ✓ Understand Thin Film Electroluminescent Displays, AC Powder Electroluminescent Displays; Organic Electroluminescent Displays: OLEDs, Active Matrix for OLED Displays ✓ Be aware of Colorant Transposition Displays, MEMs Based Displays, 3-D Displays, 3-D Cinema Technology, Autostereoscopic 3-D Technology ✓ Understand Liquid Crystals on Silicon Reflective Micro-display, Trans missive Liquid Crystal Micro-display, MEMs Micro-display, DLP Projection Technology.
Indicative Syllabus	1.Introduction (2 hours) o How applications have been driving display developments? o Evolution of display technology 2. Human visual system (8 hours) o Eye anatomy and eye optics o Visual performance of the eye o Models of visual performance and photometry 3. Color vision and colorimetry (12 hours)

	○ Color vision basics ○ Color matching experiments and color matching functions ○ Color systems and spaces ○ Colorimetry 4. 2D display technology and operation (16 hours) ○ Display system interfaces and performance parameters ○ CRT displays ○ Flat panel displays: AMLCD, LCOS, Plasma, OLED, ○ Projection systems ○ New display technologies: high dynamic range display, enriched color display 5.Display metrology: display performance measurement and calibration (6 hours) ○ General principles of display evaluation ○ Evaluation of 2D displays ○ Color management and calibration 6. Binocular vision and 3D display technology (6 hours) ○ Binocular vision and perception basics ○ 3D display principles and techniques ○ head-mounted displays ○ Spatially immersive displays
Teaching/Learning Methodology	**Lecture:** the fundamentals of physics, chemistry, design, manufacturing processes and various applications of displays will be described using ppt presentations, demonstrating videos, Internet. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. **Tutorial:** a set of problems and group discussion topics will be arranged in the tutorial classes. Students are encouraged to solve problems before having solutions.
Assessment Methods	Continuous assessment: 40% Written Report 20% Oral Presentation 40% Continuous assessment consists of assignments, laboratory reports and mid-term test.

	The continuous assessment will assess the students' understanding of basic concepts and principles in materials science.
Students' Working Load - ECTS	Lectures 50 hours Written Report 8 hours Oral Presentation 2 hours Homework 60 hours In total 120 hours → **4ECTS**
Reading List and References	1. Organic Electronics: Materials, Manufacturing, and Applications: Hagen Klauk 2. Organic Electronics II: More Materials and Applications: Wiley, Hagen Klauk 3. Color vision and colorimetry: theory and applications (by Daniel Malacara) 4. Electronic image display (by Jon C. Leachtenauer)

Course Title	Organic Electronics Devices
Instructor	Dr. Ioannis.Kaliakatsos giankal@hmu.gr
Study level	≥4 semester
ECTS	4
Prerequisite	None
Objectives	The aim of this subject is to provide a course treating the emerging field of Organic Electronics from basics. Organic Semiconductors are an important introductory part of this course. The theory and practice of fabricating discrete and integrated molecular electronic devices and their applications in diverse fields is covered. Means of achieving various electronics functionalities such us memory, logic, etc. by the molecules are treating. Lessons from biological molecular behavior for organic electronics is also examined. An introduction to nano-photonics and nano-FET is also included
Intended Learning Outcomes	Upon completion of the subject, students will be able to: ✓ Understand the physics behind organic semiconductors ✓ Calculate transport properties in the mesoscopic systems. ✓ Identify the molecules that can be used for different functions in organic electronics ✓ Chose a proper method (or different methods) for fabricating particular component ✓ Exploit the behavior of biomolecules for organic electronics ✓ Gain an introductory knowledge on nano-photonics and nanodevices
Indicative Syllabus	• Introduction to Organic Electronic • Electronic transport in crystalline organic materials and conductive polymers • Conducting Polymers, small molecules organic semiconductors, • Polymer organic semiconductor, • Electrical and optical properties of organic semiconductors. • Basic Organic LED structure, thin film layers: Hole injection, hole transport, emissive, electron transport and electron injection layers used in organic LEDs. • Fabrication and characterization techniques. • Recent advances in organic LEDs

	• Applications of OLEDs • History of Organic TFTs • Device design of OTFT, device preparation and characterization • Applications of OTFTs • Optically-pumped organic semiconductor lasers • Electrically-driven organic lasers • Recent advances in solid-state organic lasers • NanoFETs • Fabrication of different types of sensors using organic semiconductors, • Study of different sensors using conjugated polymers.
Teaching/Learning Methodology	**Lecture:** the fundamentals of organic semiconductors physics and various applications in organic electronics devices will be described using ppt presentations, demonstrating videos, Internet. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. **Tutorial:** a set of problems and group discussion topics will be arranged in the tutorial classes. Students are encouraged to solve problems before having solutions.
Assessment Methods	Continuous assessment: 40% Written Report 20% Oral Presentation 40% Continuous assessment consists of assignments, laboratory reports and mid-term test. The continuous assessment will assess the students' understanding of basic concepts and principles in materials science.
Students' Working Load - ECTS	Lectures 50 hours Written Report 8 hours Oral Presentation 2 hours Homework 60 hours In total 120 hours → **4ECTS**

Reading List and References	1. Handbook of Organic electronics and Photonics: Hari Singh Nalwa 2. Organic Electronics: Materials, Manufacturing, and Applications: Hagen Klauk 3. Organic Electronics II: More Materials and Applications: Wiley, Hagen Klauk

Course Title	Antennas & Wireless Communications
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	3rd Year and above
ECTS	4-ECTS* * Based on the 5-year undergraduate curriculum of the Electronic Engineering Department of HMU (Course 502), but modified according to the actual workload of the Erasmus students.
Prerequisite	Basic knowledge of engineering electromagnetics (electromagnetic fields and waves, Maxwell equations, boundary conditions, boundary value problems, etc.)
Learning Outcomes	The explosive growth and continuous development of the wireless and personal telecommunication systems creates a growing demand for telecommunication engineers with (a) very good background on the theory of antennas and electromagnetic wave propagation, and (b) special knowledge and experience in modern wireless systems. This course prepares students for a career in the rapidly evolving telecommunications industry, because the antenna is the interface between any telecommunication system and the transmission means in wireless communications. This course aims to get students acquainted with the principles of antenna theory and electromagnetic wave propagation, in order to use them during analysis and design of wireless telecommunication links. Upon successful completion of the course, students will have acquired knowledge, skills, appropriate tools for dealing with practical applications related to antennas and propagation models, as well as experience in designing and optimizing real antennas. More specifically students will be able to: + understand electromagnetic theory and its applications to antennas and transmission of electromagnetic signals carrying information, + understand the theory of antennas and electromagnetic wave propagation in a uniform way, in order to use them in the analysis and design of wireless telecommunications, + describe the basic mechanisms of radio wave propagation and understand the interaction of electromagnetic waves with the environment,

	+ be aware of the wave propagation phenomena caused in the real environment and the measurement methods used in practice, + calculate and measure the basic antenna parameters and characteristics (eg radiated power, radiation intensity, directivity, gain, radiation resistance), + compare antenna characteristics (advantages/disadvantages), deciding which is the most suitable antenna for each practical application, + perform antenna and electromagnetic radiation measurements, + familiarize with various practical antenna devices, + calculate the radiation diagram of an antenna, when its current distribution is known, + evaluate propagation models and select the appropriate model for calculating losses in a telecommunications link, + prepare radio coverage studies, + be informed about the latest developments in the field of wireless and personal communication systems, + analyze and design wireless telecommunication systems according to the respective needs, + be ready to supervise and maintain wireless telecommunications systems. The course is at the core of the Electronic Engineer curriculum. Note: The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects: Review on telecommunications and electromagnetic theory. Electric, magnetic, electromagnetic field. Electrical signals. Telecommunication systems. Wireless telecommunications. Frequency spectrum (HF, VHF, UHF, microwaves). Maxwell Equations. Wave equations. Boundary conditions. Scalar and vector potentials. Fields of sinusoidal time change. Electromagnetic radiation and power. Poynting vector. Planar electromagnetic waves [polarization, wave propagation in conductive and non-conductive media, phase and group velocities, reciprocity]. Reflection and refraction of planar waves [Snell's law, Fresnel equations, reflection and transmission coefficients, normal and oblique incidence on perfect dielectric and lossy media, standing waves, incidence on dielectric plates, scattering]. Transmission lines [complex and characteristic line resistance, wave reflection, transmitted power, adjustment, standing wave, Smith diagram]. Microwave waveguides [parallel plated, rectangular, circular, coaxial, microstrip, dielectric]. Optical waveguides. TE, TM and TEM propagation modes. Power and losses. Rectangular and cylindrical cavities. Electromagnetic waves in free space. Introduction to antenna theory. Antenna and transmission line matching.

	Radiation mechanisms. Antenna characteristics, radiation diagrams, gain, bandwidth, quality factor. Theory of simple linear antennas. Analysis of antennas with assumed current distributions. Hertz dipole. Applications of electrically small antennas. Linear dipole antennas. Field and radiation pattern, directivity, gain, radiation resistance, active antenna height. Dipole λ/2. Traveling wave antennas. Loop antennas. Antennas above perfect ground. Mirroring and image theory. General analysis of the radiation field of any antenna. Applications. Antenna arrays. Rhombic antenna. Principles of antenna design. Applications. Linear arrays. Uniform linear arrays with small and large number of elements. Polynomial theory of linear arrays. Applications. Superdirective antennas. Phase detection. Methods of radiation pattern synthesis. Dolph-Chebyshev linear arrays. Composition of linear arrays with Fourier sums. Applications and examples of antenna analysis and synthesis. Antenna applications and measurements. Aperture antennas. Radiation from flat surfaces. Radiation from rectangular surfaces. Horn antennas. Parabolic reflector antennas. Horn-reflector antennas. Lens antennas. Passive reflectors. Input antenna resistance. Equivalent sources. Magnetic charges and currents. Voltage and current sources. Reciprocity theorem. Self-impedance of conductive antennas. Voltage induced on open-ended antenna by an incident field. Induced electromotive force method. Transmission and reception equivalent circuits. Dipole near field. Bandwidth. Receiving antennas. Antenna polarization. Noise in telecommunication systems and antenna noise temperature. Dipole self-impedance. Antenna as terminal impedance. Asymmetric excitation of dipoles. Matching conditions and maximum transmitted power. Matching using stubs. Folded dipole. Mutual complex resistance between dipoles. Antenna array excitation impedance. Impedance of dipoles above perfect ground. Antenna feeding with appropriate currents. Yagi-Uda antennas. The antenna as a receiver. Equality of mutual complex resistances. Equality of transmission and reception radiation patterns. Equality of transmission and reception self-impedances. Equality of transmission and reception antenna active heights. Active antenna surface. Received to transmitted power ratio. Transmission of waves in free space. Friis equation. Losses and maximum transmission distance. Radar equation. Propagation of electromagnetic waves in the earth environment. Ground reflection of obliquely incident plane waves with vertical or parallel

	polarization. Brewster angles. Ground wave. Space wave. Surface wave. Antennas elevated above ground level. Approximate relationship for propagation at very high frequencies. Near ground surface wave tilt and polarization. Spherical earth. Effects of the earth's curvature. Line-of-sight condition. Barrier effects in wave propagation. Diffraction links. Tropospheric refractive index. Tropospheric propagation, refraction, waveguiding, scattering. Radio horizon. Multiple routes. Intervals. Differential reception systems. Atmosphere attenuation. Critical frequency and ionosphere changes. Ionospheric propagation, refraction, reflection, scattering. Applications. Calculation of radio links. Over sharp obstacle links. Line-of-sight links. Above perfect ground links. Technical characteristics and practical applications of wireless links.
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	• C. Parini, S. Gregson, J. McCormick, D.J. van Rensburg, and T. Eibert, *Theory and Practice of Modern Antenna Range Measurements*, SciTech Publishing, 2021 (2nd Edition), ISBN-10: 1839531282. • ARRL, *The ARRL Antenna Book for Radio Communications,* American Radio Relay League, 2019 (24th edition), ISBN-10: 1625951116. • J. Volakis, *Antenna Engineering Handbook,* Mc Graw Hill, 2018 (5th edition), ISBN-10: 1259644693. • J.D. Kraus, R.J. Marhefka, and A.S. Khan, *Antennas and Wave Propagation*, Mc-Graw Hill India, 2017 (5th edition), ISBN-10: 9352606183. • R.J. Mailloux, *Phased Array Antenna Handbook*, Artech House, 2017 (3rd Edition), ISBN-10: 1630810290. • C.A. Balanis, *Antenna Theory: Analysis and Design*, Wiley, 2016 (4th edition), ISBN-10: 1118642066. • W.L. Stutzman and G.A. Thiele, *Antenna Theory and Design*, Wiley, 2012 (3rd edition), ISBN-10: 0470576642. • S.K. Das and A. Das, *Antenna and Wave Propagation*, Tata Mc-Graw Hill Education, 2012, ISBN-10: 1259097587. • J. Carr and G. Hippisley, *Practical Antenna Handbook,* Mc Graw Hill, 2011 (5th edition), ISBN-10: 9780071639583. • R.E. Collin, *Antennas and Radiowave Propagation,* Mc-Graw Hill, 1985, ISBN-10: 0070118086. ***Related to Wireless Communications*** • R.L. Haupt, *Wireless Communication Systems: An Introduction*, Wiley-IEEE Press, 2019, ISBN-10: 1119419174. • R.W. Heath and A. Lozano, *Foundations of MIMO Communication*, Cambridge University Press, 2018, ISBN-10: 0521762286. • C. Beard and W. Stallings, *Wireless Communication Networks and Systems*, Pearson, 2015, ISBN-10: 9780133594171. • D. Tse and P. Viswanath, *Fundamentals of Wireless Communication*, Cambridge University Press, 2005, ISBN-10: 0521845270.

	• A. Goldsmith, *Wireless Communications*, Cambridge University Press, 2005, ISBN-10: 0521837162. • W. Stallings, *Wireless Communications and Networks*, Pearson, 2004 (2nd Edition), ISBN-10: 9788132231561. • T. Rappaport, *Wireless Communications: Principles and Practice*, Prentice Hall, 2002 (2nd Edition), ISBN-10: 0130422320.

Course Title	Satellite Communications and Systems
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	3rd Year and above
ECTS	4-ECTS* * Based on the 5-year undergraduate curriculum of the Electronic Engineering Department of HMU (Course 712), but modified according to the actual workload of the Erasmus students
Prerequisite	Basic knowledge of telecommunication systems.
Learning Outcomes	Satellites have the unique ability to provide coverage in large geographic areas and to connect remote and inaccessible telecommunication nodes. Thus satellite networks are now an integral part of most telecommunications systems. In recent decades the technology of satellite systems is advancing constantly and the use of all kind of satellites for long distance communications is developing rapidly. Today, electronic engineers face the absolute necessity to have in depth knowledge of the satellite technology, communications and links, because satellite communications play an ever-increasing role in modern telecommunication systems. This course properly prepares students for a career in the rapidly evolving telecommunications industry. The aim of this course is to familiarize tomorrow's electronics/telecommunications engineers with the analysis of satellite communication systems and the design of satellite links. The course covers the total of the required theoretical and practical background. Upon successful completion of the course, students will have acquired the necessary knowledge and skills to: + understand the structure of any satellite communications system, + understand the basic principles and concepts governing satellite communications, + understand the operation of satellite systems and the principles of modern telecommunications networks, + understand the design issues and options concerning satellite links, + have experience in the design and optimization of real telecommunication systems, which can be used for the analysis and design of new microwave and satellite radio links, + design and analyze satellite communication systems, + be familiar with various practical antenna devices, + have initial training in satellite link design,

	+ be familiar with radio propagation models and modern techniques for digital modulation and voice-data information encoding, + be informed about the latest developments in the field of wireless and personal communication systems, + be familiar with the modern satellite technology, communications systems, assembly and subsystems, + supervise and maintain satellite communication systems, + understand the factors that degrade the quality of satellite wireless links and the methods to overcome this degradation, + evaluate the quality of services provided by satellite communications systems, + be familiar with the multiple access satellite networking techniques and the modern standards for satellite communications and mobile telephony systems. The course is at the core of the Electronic Engineer curriculum. **Note:** The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects: Configuration of a satellite communication system. Radio frequencies of satellite services. Motion, position and orbit of satellites. Satellite networks. Geosynchronous, geostatic, GEO, LEO satellites. Satellite segments. Basic features related to satellite link design [radio regulations, transmission/broadcasting types, line of sight, link power budget, refractive index, Fresnel zones, troposcatter links]. Electromagnetic wave propagation and the satellite radio channel. Radiation characteristics and types of satellite dishes. Parabolic antenna and targeting control. Noise measures. Signal noise in satellite systems. Space environment. Absorption, diffusion, refraction and depolarization of electromagnetic wave signals in the satellite channel. Effects of rainfall, noise and propagation medium on the satellite link power balance. Frequency reuse techniques. Channel configuration, modulation and coding. Analog techniques PM, FM. Digital communication techniques. Digital signal modulation. Custom filter analysis. Error possibility in digital communications. FSK, PSK, QPSK, DPSK, DQPSK, MSK modulations/encodings (with emphasis on demodulation, spectrum and error probability). Spectrum modulation techniques. Telecommunication satellite and ground station platform, configuration and subsystems (monitoring, control, position stabilization, orbit determination, propulsion, telemetry, communication, thermal control, power supply/generation). Satellite types. Earth stations. Receiver input. RF-filters and satellite signal frequency converters. Power amplifiers and low noise satellite signal amplifiers. Amplification non-linearity. Effects of noise, filtering, frequency conversion and amplification on satellite system design. Analysis of error possibility in satellite systems.

	Methods of coding, detection and error correction in satellite systems. Rectangular, semi-rectangular, linear (Hamming, Golay, BCH, Reed-Solomon), circular and convolutional codes. Error checking, parity check, syndromes. Error correction. Spectrum control. Satellite channel capacity. Coding gain. Channel discrete model. Coding error possibility. State diagrams. Coding trees. Trellis chart. Coding systems evaluation. Communication payload. Channel and modulation type performance. Bit error rate in digital data transmission systems. Noise factor. Noise models (white, pink, Gaussian). Factors affecting satellite link reliability and availability. Space differential reception. Effects of rainfall, depolarization and neighboring satellite interference on satellite system performance. Study of satellite communication systems. Satellite link design based on ITU's specifications and recommendations. Applications. Multiplexing techniques FDM, FDM/MA, TDM, TDM/MA, CDMA, Carrier Sense Multiple Access, CSMA/ Collision Avoidance, CSMA/Collision Detection (signal to noise ratios, multipath, jamming). Frequency Division Multiple Access System FDMA (with emphasis on nonlinear phenomena effects). Time Division Multiple Access System TDMA (with emphasis on synchronization, carrier retrieval, identity word detection and frame synchronization). Code division multiple access systems DS-CDMA and FH-CDMA (with emphasis on interpolation analysis). Satellite system protocols ALOHA, S-ALOHA, R-ALOHA. Services: telecommunication audio systems, telephony, analog TV, digital TV, direct to home broadcasts, SMATV, satellite news gathering, VSAT, meteorology, global atmospheric research program, geostationary meteorological satellites, sea navigation, Global Positioning System, differential GPS, mobile communications, Iridium, computer networks, fast internet, video on demand, multimedia services, video conferencing, telemedicine, geography, topography, GIS. Satellite installation and launch vehicles. Reliability of satellite communication systems.
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	• G. Maral, M. Bousquet, and Z. Sun, *Satellite Communications Systems: Systems, Techniques and Technologies*, Wiley, 2020 (6th Edition), ISBN-10: 1119382084. • T. Pratt and J.E. Allnut, *Satellite Communications*, Wiley, 2019 (3rd Edition), ISBN-10: 1119482178. • L.J. Ippolito, *Satellite Communications Systems Engineering: Atmospheric Effects, Satellite Link Design and System Performance*, Wiley, 2017 (2nd Edition), ISBN-10: 1119259371. • M.O. Kolawole, *Satellite Communications Engineering*, CRC Press, 2016 (2nd Edition), ISBN-10: 1138075353.

	• D. Minoli, *Innovations in Satellite Communications and Satellite Technology: The Industry Implications of DVB-S2X, High Throughput Satellites, Ultra HD, M2M, and IP*, Wiley, 2015, ISBN-10: 1118984056. • M. Richharia, *Mobile Satellite Communications: Principles and Trends*, Wiley, 2014 (2nd Edition), ISBN-10: 1119998867. • R. Cochetti, *Mobile Satellite Communications Handbook*, Wiley, 2014 (2nd Edition), ISBN-10: 1118357027. • K.N. Raja Rao, *Satellite Communication: Concepts and Applications*, PHI Learning, 2013 (2nd Edition), ISBN-10: 8120347250. • R.M. Gagliardi, *Satellite Communications*, Springer, 2012 (2nd Edition), ISBN-10: 9401097623. • T.M. Braun, *Satellite Communications Payload and System*, Wiley-IEEE Press, 2012, ISBN-10: 0470540842. • F. Gustrau, *RF and Microwave Engineering: Fundamentals of Wireless Communications*, Wiley, 2012, ISBN-10: 1119951712. • P. Fortescue, G. Swinerd, and J. Stark, *Spacecraft Systems Engineering*, Wiley, 2011 (4th Edition), ISBN-10: 047075012X. • D.R. Cheruku, *Satellite Communication*, IK International Publishing, 2009, ISBN-10: 9380026412. • D. Roddy, *Satellite Communications*, McGraw-Hill, 2006 (4th Edition), ISBN-10: 0071462988. • A. Fares, *Satellite Communications Engineering*, BookSurge Publishing, 2006, ISBN-10: 1419639056.

Course Title	Scattering, Propagation & Radiation of Electromagnetic Waves
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	4th Year and above dfbd
ECTS	4-ECTS* * Based on the 5-year postgraduate curriculum of the Telecommunications & Automations Systems MSc of the Electronic Engineering

	Department of HMU (Course TeleAutoS-11), but modified according to the actual workload of the Erasmus students
Prerequisite	Basic knowledge of engineering electromagnetics (electromagnetic fields and waves, Maxwell equations, boundary conditions, boundary value problems, etc.)
Learning Outcomes	Aim of this course is the qualitative understanding and mathematical formalism of the concepts concerning the electromagnetic fields and the propagation, radiation and scattering of electromagnetic waves through their correlation with intelligible applications and phenomena, in order to create the necessary background, knowledge and experiences at the level of the advanced engineering electromagnetics and computing. Additional purpose is to develop the skills and abilities, which are necessary for the scientific and technical subject of the electronic and telecommunication engineer. Upon completion of the course the postgraduate students are expected to be able to: + understand the correlation between several types of sources and the corresponding fields' characteristics, + understand the concepts of vector field, electric field, Ampere's law, magnetic field, Faraday's law, Gauss' laws, induction, wave, interconnected existence of electric and magnetic field in case of time change, physical origin of electromagnetic waves, Maxwell's integral and differential equations for continuous and time-varying fields, propagation, radiation and scattering of electromagnetic waves and fields in space and time, + understand the electrical properties of materials (conductive/dielectric, isotropic/anisotropic, homogeneous/inhomogeneous, dispersive/nondispersive, linear/nonlinear, time-constant/time-varying, simple/metamaterials), + calculate differential (divergence, rotation) and integral quantities (flow, circulation) of fields in the main coordinate systems (Cartesian, cylindrical, spherical), as well as the electric and magnetic field, the corresponding potentials and the amounts of energy in given physical problems, + elaborate on electromagnetic theory and Maxwell's equations, + analyze and evaluate the technological applications concerning the broader field of electronic and telecommunication engineering, recognizing the presence and impact of electromagnetic field phenomena, + formulate given time-varying electromagnetic problems into mathematical expressions of boundary value problems, through differential equations with appropriate initial and/or boundary conditions, + handle simple and rather complex boundary value problems of electromagnetic field calculation using Maxwell equations, boundary conditions, auxiliary potentials and appropriate methods and techniques, + systematically deal with electromagnetic boundary value problems using analytical and computational methods,

	+ understand the various phenomena of electromagnetic wave propagation, radiation and scattering, along with the corresponding quantities/concepts that characterize, distinguish and categorize them, + apply the taught methods and techniques for the analysis of electromagnetic problems, the composition of proper solutions and the evaluation of appropriate alternatives. The course is at the core of the Electronic/Telecommunications Engineer postgraduate curriculum. Note: The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects: Time-varying and time-harmonic electromagnetic fields (Maxwell's equations, constitutive parameters and relations, circuit-field relations, boundary conditions, power and energy, time-harmonic electromagnetic fields). Electrical properties of matter (dielectrics, polarization and permittivity; magnetics, magnetization and permeability; current, conductors and conductivity; semiconductors; superconductors; metamaterials; linear, homogeneous, isotropic and nondispersive media; AC variations in materials). Wave equation and its solutions (time-varying electromagnetic fields; time-harmonic electromagnetic fields; solutions to the wave equation in the rectangular, cylindrical and spherical coordinate systems). Wave propagation and polarization (Transverse Electromagnetic Modes; uniform plane waves in unbounded lossless and lossy media at principal axis and oblique angle; polarization). Reflection and transmission (Normal and oblique incidence in lossless media; lossy media; reflection and transmission of single slab, multiple layers and multiple interfaces; polarization characteristics on reflection; metamaterials). Auxiliary vector potentials; construction of solutions; radiation and scattering equations (vector potentials; construction of solutions; solution of the inhomogeneous vector potential wave equation; far-field radiation; radiation and scattering equations). Electromagnetic theorems and principles (duality theorem; uniqueness theorem; image theory; reciprocity theorem; reaction theorem; volume equivalence theorem; surface equivalence theorem (Huygens's principle); induction theorem; physical equivalent and physical optics equivalent; induction and physical equivalent approximations). Rectangular cross-section waveguides and cavities (rectangular waveguide; rectangular resonant cavities; hybrid LSE and LSM modes; partially filled waveguide; transverse resonance method; dielectric waveguide; artificial impedance surfaces; stripline; microstrip line; ridged waveguide). Circular cross-section waveguides and cavities (circular waveguide; circular cavity; radial waveguides; dielectric waveguides and

	resonators). Spherical transmission lines and cavities (construction of solutions; biconical transmission line; spherical cavity). Scattering (infinite line-source cylindrical wave radiation; plane wave scattering by planar surfaces; cylindrical wave transformations and theorems; scattering by circular cylinders; scattering by a conducting wedge; spherical wave orthogonalities, transformations, and theorems; scattering by a sphere). Integral equations and Method of Moments (integral equation method; electric and magnetic field integral equations; finite diameter wires; two-dimensional radiation and scattering; Pocklington's wire radiation and scattering; Numerical Electromagnetics Code). Geometrical theory of diffraction (geometrical optics; straight edge diffraction at normal and oblique incidence; curved edge diffraction at oblique incidence; equivalent currents in diffraction; slope diffraction; multiple diffractions). Diffraction by wedge with impedance surfaces (impedance surface boundary conditions and reflection coefficients; Maliuzhinets impedance wedge solution; geometrical optics; surface wave terms; diffracted fields; surface wave transition field; computations). Green's Functions (Green's functions in engineering; Sturm–Liouville problems; two-dimensional Green's function in rectangular coordinates; Green's identities and methods; Green's functions of the scalar Helmholtz equation; dyadic Green's functions).
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	• A.S. Khan and S.K. Mukerji, *Electromagnetic Fields: Theory and Applications*, CRC Press, 2020. • N. Ida, *Engineering Electromagnetics*, Springer, 2020 (4th Edition), ISBN-10: 3030155560. • S. Balaji, *Electromagnetics Made Easy*, Springer, 2020, ISBN-10: 9811526575. • M.-S. Kao and C.-F. Chang, *Understanding Electromagnetic Waves*, Springer, 2020, ISBN-10: 3030457079. • M. Sadiku, *Elements of Electromagnetics*, Oxford University Press, 2018 (7th Edition), ISBN-10: 0190698616. • M. Nahvi and J. Edminister, *Schaum's Outline of Electromagnetics*, McGraw-Hill, 2018 (5th Edition), ISBN-10: 126012097X. • A. Ishimaru, *Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications*, Wiley-IEEE Press, 2017 (2nd Edition), ISBN-10: 1118098811. • A.V. Osipov and S.A. Tretyakov, *Modern Electromagnetic Scattering Theory with Applications*, Wiley, 2017, ISBN-10: 0470512385. • D.H. Werner and Z.H. Jiang, *Electromagnetics of Body Area Networks: Antennas, Propagation, and RF Systems*, Wiley-IEEE Press, 2016, ISBN-10: 1119029465.

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Course Title	Electromagnetic Compatibility
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	3rd Year and above
ECTS	4-ECTS* * Based on the 5-year undergraduate curriculum of the Electronic Engineering Department of HMU (Course 887), but modified according to the actual workload of the Erasmus students.
Prerequisite	Basic knowledge of electromagnetics.
Learning Outcomes	The course covers the theoretical and practical background required for: electromagnetic theory and its applications, electromagnetic compatibility (EMC) principles, electromagnetic interference (EMI) and methods for suppressing EMI effects, EMC measurements, analysis and design of electromagnetically compatible devices and systems. Upon successful completion of the course the students will be able to: + have in-depth knowledge of electromagnetic theory principles, + be able to present uniformly the theory of propagation, scattering and radiation of electromagnetic waves, so that the electromagnetic behavior of practical telecommunication systems can be understood, + explain and present in a comprehensive way the theory of electromagnetic compatibility, + be extremely familiar with possible electromagnetic effects-interference in devices and systems, + be informed about the regulations and the electromagnetic compatibility standards currently applicable, + measure electromagnetic interference in various cases, + certify the electromagnetic compatibility of simple devices, + design circuits and devices free from electromagnetic interference. The course is at the core of the Electronic Engineer curriculum. **Note:** The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects:

	Electromagnetic Compatibility (EMC) overview. Definitions. Examples of EMC problems. Noise sources (natural and man-made sources). General methods for solving interference problems and complying with EMC requirements. EMC regulations and tests. Basic concepts of electromagnetism and their use in EMC (ferromagnetic materials). Maxwell's equations from the EMC point of view (Maxwell, Poisson and Laplace equations). Near and far field approaches and energy flow. The near field, the far field and the energy flow around small wire and small loop antennas. Fields of high and small impedance. Reaction fields. Electromagnetic waves in various media (refractive index, characteristic impedance of dielectrics). Near field impedance. The importance of the impedance concept. The impedance in front of a boundary surface (λ/2 dielectric windows, λ/4 and λ/2 layers). Plane waves in arbitrary media (propagation constant, penetration depth). Wave propagation in good conductors. Internal resistance of conductors. Diffusion. Maxwell's equations in integral form. Faraday and Ampere laws. Electric fields in conductors. Illustrative examples in EMC. Interference in small loops. Interpretation of measurements at various distances. Capacitive and inductive coupling. Transient switching phenomena (transformer feeding, transformer's power supply interruption, early time transitions). Input resistance of materials with losses. TEM wave incidence on boundary surfaces. TEM wave propagation. A first approximation of the transmission factor. Re-reflection effects. Shielding efficiency. Decibels and Nepers. Multi-layer media reflection coefficient. Absorber design and affecting factors. Absorber performance at various frequencies. Real absorber examples. Transmission lines and waveguides. Impedance and phase shift of ideal lines. Characteristic impedance of lines with losses. Voltage and current reflection coefficients. Short-circuited transmission line input impedance. Coupling between transmission lines. Inductively coupled directional couplers. Short-length line coupling. Transmission line coupling and the corresponding mathematical framework. Coupling of shielding currents with signal wires. Waveguides and resonators. Cutoff frequency and attenuation constant. Effectiveness of apertures'/openings' shielding. Resonator tuning. Shielding theory and practical applications. Static or almost static field protection. Magnetostatic protection. Superconductive materials shielding. Electrostatic shielding. Equivalent shielding circuit models. Electric field shielding. Almost static magnetic field shielding. Plane wave or transmission line shielding models. Extensions of plane wave theory to non-ideal situations. Shielding theories relationship with practical applications. Apertures, windows and thin conductive films. Alternative ways to describe shielding quality. Cables and connectors. Conclusions and comments about earthing/grounding. Spectral analysis and antenna theory in EMC. Basic principles. Harmonic distortion. Intermodulation distortion or mixing. Spectral analysis. Fourier series. Fourier series of pulse trains. Fourier transforms. Fast Fourier transforms. Spectrum analyzers. Finite rise time

	effect. Coil voltage noise. Fourier spectrum approach. Interference bandwidth. Antennas and radiation. Differential-mode and common-mode radiation. Antenna general characteristics (field, radiation and power patterns, directivity, gain, radiation resistance, effective area). Slot antennas and apertures. Radiation field estimation and measurement. Loop radiation (loops with Z<Zo or Z>Zo impedance). Radiated field estimation (basic calculation, intensity calculation spreadsheet). Common-mode cable radiation. Computer codes for radiation estimation. Broadband antennas. Electromagnetic field generation for EMC tests. Crawford cell. GTEM cell. Reverberation chambers. Coupling calculation examples. Earthing, security and signal grounding. Cable grounding and pigtails. Single and multiple shielding housings' grounding. Passive components (conductors, resistors, capacitors and coils). Filters. Isolation and supression. Isolation techniques (balanced or compensated circuits, transformers, common-mode suppression coils, optical isolators and optical fibers. Suppression techniques. Design of electromagnetically compatible circuits. EMC system design.
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	• LearnEMC LLC, T. Hubing, and N. Hubing, *Study Guide for the iNARTE Electromagnetic Compatibility (EMC/EMI) Certification Exam – 2020*, 2020. • C. Kathalay, *A Practical Approach to Electromagnetic* • *Compatibility: With an Introduction to CE Marking*, 2020, ISBN-13: 979-8665728742. • H. Zhang, Y. Zhang, C. Huangm Y. Yuan, and L. Cheng, *Spacecraft Electromagnetic Compatibility Technologies*, Springer, 2020, ISBN-10: 9811547815. • M. Van Helvoort and M. Melenhorst, *EMC for Installers: Electromagnetic Compatibility of Systems and Installations*, CRC Press, 2018, ISBN-10: 1498702481. • A. Ishimaru, *Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications*, Wiley-IEEE Press, 2017 (2nd Edition), ISBN-10: 1118098811. • T. Williams, *EMC for Product Designers*, Newnes, 2016 (5th Edition), ISBN-10: 0081010168.

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Course Title	Microwave Communications
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	3rd Year and above
ECTS	4-ECTS* * Based on the 5-year undergraduate curriculum of the Electronic Engineering Department of HMU (Course 811), but modified according to the actual workload of the Erasmus students.
Prerequisite	Basic knowledge of engineering electromagnetics (electromagnetic fields and waves, Maxwell equations, boundary conditions, boundary value problems, etc.)
Learning Outcomes	Microwaves are widely used in radar (shipping, meteorology, air traffic control), terrestrial and satellite telecommunication links, medicine (tomography, hyperthermia), astrophysics (star observation), physics (spectroscopy, acceleration), industry, in everyday life (microwave ovens, antennas, vehicle speed measurement). On the other hand, the future of wireless communications (5G, MIMO) is based on millimeter waves. Therefore, familiarity of the electronic/telecommunication engineers with microwave theory, millimeter waves and their applications is necessary. This course properly prepares students for a career in the rapidly evolving telecommunications industry. The aim of this course is to familiarize electronic/telecommunication engineers with the technology of microwave and millimeter waves and their applications, in order to fully understand the operation of wired and wireless telecommunication systems. Upon completion of this course students will have acquired the necessary knowledge and skills, the appropriate tools for dealing with practical applications related to waveguides and antennas, as well as the experience to design and optimize real telecommunication systems, in order to: + select the most appropriate propagation mean and spectrum part for each telecommunication system, + analyze any transmission line and propagation mean, + evaluate the performance of telecommunication systems based on the propagation means it is using, + analyze and design wired and wireless telecommunication systems according to the needs, + be able to supervise and maintain wired and wireless telecommunication systems, and + design telecommunication systems using different transmission lines. Upon successful completion of the course, the students will: + understand the theory of microwaves and electromagnetic wave propagation in a unified manner, in order to use them for the analysis and design of wireless telecommunications links, + familiarize with the various phenomena at microwave and millimeter-wave frequencies,

	+ understand the behavior of any waveguide and of the microwave energy transmission over distance (point-to-point transmission and reception), + understand the operation of various elements, circuits and devices at microwave and millimeter frequencies, + familiarize with active and passive microwave components of modern telecommunication systems, + gain experience in measuring the basic characteristics and parameters of microwave devices, + familiarize with various waveguiding and propagation layouts of practical interest, in order to compare their characteristics (advantages/disadvantages), deciding which is the most appropriate for each practical application, + be informed about the latest developments in the field of wired and wireless telecommunications, + gain experience in the design of components (transmission lines, waveguides, power generators, amplifiers), circuits and systems, + gain experience in the analysis of microwave networks, + gain experience in designing and optimizing real telecommunication systems, which can be used in the analysis and design of new microwave, millimeter and optical systems. The course is at the core of the Electronic Engineer curriculum. **Note:** The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects: Review of electromagnetic theory (description of electromagnetic phenomena, Maxwell equations, boundary conditions, electromagnetic field power and energy, planar electromagnetic waves, propagation and attenuation of electromagnetic waves, polarization). Wired and wireless communications. Transmission line theory. Transverse and sinusoidal time-varying waves in transmission lines. Characteristic impedance and complex resistance in transmission lines. Smith chart. Standing waves in transmission lines without losses. Propagation constant and speed in transmission lines. Load matching in transmission lines using λ/4 transformers, one or two short-circuited stubs, or non-uniform transmission lines. Non-periodic phenomena in transmission lines. Coupled transmission line analysis. Wired transmission line types (two-wire or coaxial lines). Phase and amplitude distortion. Balanced and unbalanced lines. Phone network. Phase instability, cross-talk, impact noise, structured cabling.

	Waveguiding. Guided waves and waveguide modes. Parallel-plate waveguide. Description of waves. Separation of variables method. TE, TM, TEM modes. Radial description of wave propagation. Propagation and waveguide losses. Waveguides of rectangular cross section. Wave equation solution. Cutoff conditions. Boundary conditions. Field components in Cartesian coordinates. TM and TE modes. Excitation, characteristic resistance and attenuation of rectangular waveguide modes. Rectangular waveguide resonator. Waveguides of circular cross section. Wave equation solution. Cutoff conditions. Boundary conditions. Field components in cylindrical coordinates. TM and TE modes. Excitation, characteristic resistance and attenuation of circular waveguide modes. Polarization. Circular waveguide resonator. Coaxial waveguide. TEM, TM and TE modes. Microstrip and stripline. Radial and field description of a dielectric layer waveguide. Dielectric layer and dielectric strip. Graded-index strips. Uniform and non-uniform circular optical fiber. Special types of waveguides. Propagation in lines of parallel conductors. Mode excitation. Dielectric and magnetic materials. Electron motion in ferrites. Magnetization equation. Magnetic susceptibility tensor. Wave propagation in ferrites. Faraday rotation. Ferritic microwave elements. Gyrotron. Isolator. Circulator. YIG filter. Mixing materials with different ε, μ. Waveguiding in rectangular waveguides containing strips of material (ε, μ). Non-linear waveguides and waveguides with discontinuities [propagation in a circular section of a rectangular waveguide, propagation in a rectangular waveguide with helical twist, cylindrical small poles with inductive or capacitive behavior in rectangular waveguides, probes]. Waveguide technical characteristics [metal waveguides, optical fibers, flanges, additional elements of waveguide structures, excitation, resonators, filters]. Analysis of microwave circuits [S-parameters, power, efficiency]. Description of signals in microwave circuits. Microwave multiport networks. Scattering matrices. Bidirectional and symmetrical multiport networks. Magic T coupler. Multiport networks without losses. Directional couplers. Power dividers. Other couplers. Methods of microwave network analysis. Microwave resonant circuits. Microwave filters. Integrated microwave circuits [striplines, microstrips, slotlines, coplanar lines, hybrid MICs]. Passive microwave components [design of lumped resistors-capacitors-inductors, circuits

	with lumped loads]. Waveguide matching [waveguide resistance, measurement of line resistance at any point, load resistance computation]. Electron beam interaction with electromagnetic waves. High-power microwave sources [vacuum tubes, operating limits, klystron, magnetron, traveling-wave tube (TWT), gyrotron]. Low-power microwave sources. Semiconductor and solid-state devices [bipolar transistors, microwave transistors, field-effect transistors (FETs), semiconductor oscillators, oscillator modes with electron transfer effects]. Microwave mixing diodes. Tunnel diodes. Gunn diodes. IMPATT diodes. Masers. Microwave communications [microwave circuits, terminal equipment, filters, terminal transceivers and repeaters]. Microwave applications [diagnostic and therapeutic medicine, industrial measurements, speed measurements, ovens and thermal devices]. Biological effects of microwaves [radiation limits, biological phenomena, dielectric properties of the human body, electromagnetic environment]. Millimeter wave communications and applications.
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	• A.S. Khan and S.K. Mukerji, *Electromagnetic Fields: Theory and Applications*, CRC Press, 2020. • J.P. Dunsmore, *Handbook of Microwave Component Measurements: With Advanced VNA Techniques*, Wiley, 2020 (2nd Edition), ISBN-10: 1119477131. • K. Kuang and R. Sturdivant, *RF and Microwave Microelectronics Packaging II*, Springer, 2017, ISBN-10: 3319516965. • I. Robertson, N. Somjit, and M. Chongcheawchamnan, *Microwave and Millimetre-Wave Design for Wireless Communications*, Wiley, 2016, ISBN-10: 1118917219. • S. Mumtaz, J. Rodriguez, and L. Dai, *mmWave Massive MIMO: A Paradigm for 5G*, Academic Press, 2016, ISBN-10: 0128044187. • K.-W. Yeom, *Microwave Circuit Design: A Practical Approach Using ADS*, Pearson, 2015. • A.A. Behagi, *RF and Microwave Circuit Design: A Design Approach Using ADS*, Techno Search, 2015, ISBN-10: 0996446613.

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	• R.G. Winch, *Telecommunication Transmission Systems*, McGraw Hill, 1998 (2nd Edition), ISBN-10: 007070970X. • P. Vizmuller, *RF Design Guide: Systems, Circuits, and Equations*, Artech House, 1995, ISBN: 0890067546. • G. Roussy and J.A. Pearce, *Foundations and Industrial Applications of Microwaves and Radio Frequency Fields – Physical and Chemical Processes*, Wiley, 1995, ISBN-10: 0471938491. • ARRL, *The ARRL UHF/Microwave Projects Manual – Vol. 1*, ARRL, 1994, ISBN: 0872594491. • S. Ramo, J.R. Whinnery, and T.V. Duzer, *Fields and Waves in Communication Electronics*, Wiley, 1994 (3rd Edition), ISBN-10: 0471585513. • G.H. Bryant, *Principles of Microwave Measurements*, IET, 1993 (Revised Edition), ISBN: 0863412963. • B.L. Smith and M.-H. Carpentier, *The Microwave Engineering Handbook – Vol. 1: Microwave Components*, Van Nostrand Reinhold, 1993, ISBN-10: 0442315880. • B.L. Smith and M.-H. Carpentier, *The Microwave Engineering Handbook – Vol. 2: Microwave Circuits, Antennas - and Propagation*, Van Nostrand Reinhold, 1993 (2009th Edition), ISBN 10: 1441901140. • B. Smith and M.H. Carpentier, *The Microwave Engineering Handbook – Vol. 3: Microwave Systems and Applications*, Springer, 1992 (1993rd Edition), ISBN-10: 041245680X. • D.A. Olver, *Microwave and Optical Transmission*, Wiley, 1992, ISBN-10: 047193478X. • S.F. Mahmoud, *Electromagnetic Waveguides: Theory and Applications*, IET, 1991, ISBN-10: 0863412327. • R.E. Collin, *Field Theory of Guided Waves*, Wiley-IEEE Press, 1990 (2nd Edition), ISBN-10: 0879422378. • A.E. Fantom, *Radio Frequency and Microwave Power Measurement*, IET, 1990, ISBN-10: 0863411207. • T. Itoh, *Numerical Techniques for Microwave and Millimeter-Wave Passive Structures*, Wiley-Interscience, 1989, ISBN-10: 9780471625636. N. Marcuvitz, *Waveguide Handbook*, IET, 1986, ISBN-10: 0863410588.

Course Title	Microwave-Millimeter Wave Communications & Antennas
Instructor	Asc. Professor **Ioannis Vardiambasis**, Director of the Laboratory of Telecommunications & Electromagnetic Applications, Directors of the Division of Telecommunications & Networks, Director of the MSc in "Telecommunication & Automation Systems" at the Department of Electronic Engineering of the Hellenic Mediterranean University, ivardia@hmu.gr
Study level	4th Year and above
ECTS	4-ECTS* * Based on the postgraduate curriculum of the Telecommunications & Automations Systems MSc of the Electronic Engineering Department of HMU (Course TeleAutoS-12), but modified according to the actual workload of the Erasmus students..
Prerequisite	Basic knowledge of engineering electromagnetics (electromagnetic fields and waves, Maxwell equations, boundary conditions, boundary value problems, etc.)
Learning Outcomes	Microwaves are widely used in radar (shipping, meteorology, air traffic control), terrestrial and satellite telecommunication links, medicine (tomography, hyperthermia), astrophysics (star observation), physics (spectroscopy, acceleration), industry, in everyday life (microwave ovens, antennas, vehicle speed measurement). On the other hand, the future of wireless communications (5G, MIMO) is based on millimeter waves. Therefore, familiarity of the electronic/telecommunication engineers with microwave theory, millimeter waves and their applications is necessary. The explosive growth and continuous development of the wireless and personal telecommunication systems creates a growing demand for telecommunication engineers with (a) very good background on the theory of antennas and electromagnetic wave propagation, and (b) special knowledge and experience in modern wireless systems. This course properly prepares postgraduate students for a career in the rapidly evolving telecommunications industry. This course aims (a) to familiarize electronic/telecommunication engineers with the technology of microwave and millimeter waves and their applications, in order to fully understand the operation of wired and wireless telecommunication systems, and (b) to get postgraduate students acquainted with the principles of antenna theory and electromagnetic wave propagation, in order to use them during analysis and design of wireless telecommunication links. Upon successful completion of this course postgraduate students will have acquired the necessary knowledge and skills, along with the appropriate tools for dealing with practical applications related to waveguides, antennas, and propagation models, as well as the experience to design and optimize real microwave/millimeter-wave devices, antennas, and telecommunication systems. More specifically students will be able to:

	+ select the most appropriate propagation mean and spectrum part for each telecommunication system, + analyze any transmission line and propagation mean, + evaluate the performance of telecommunication systems based on the propagation means it is using, + analyze and design wired and wireless telecommunication systems according to the needs, + be able to supervise and maintain wired and wireless telecommunication systems, + design telecommunication systems using different transmission lines, + understand the theory of microwaves and electromagnetic wave propagation in a unified manner, in order to use them for the analysis and design of wireless telecommunications links, + familiarize with the various phenomena at microwave and millimeter-wave frequencies, + understand the behavior of any waveguide and of the microwave energy transmission over distance (point-to-point transmission and reception), + understand the operation of various elements, circuits and devices at microwave and millimeter frequencies, + familiarize with active and passive microwave components of modern telecommunication systems, + measure the basic characteristics and parameters of microwave devices, + familiarize with various waveguiding and propagation layouts of practical interest, in order to compare their characteristics (advantages/disadvantages), deciding which is the most appropriate for each practical application, + be informed about the latest developments in the field of wired and wireless telecommunications, + design of components (transmission lines, waveguides, power generators, amplifiers), circuits and systems, + analyze microwave networks, + design and optimize real telecommunication systems, which can be used in the analysis and design of new microwave, millimeter and optical systems, + understand electromagnetic theory and its applications to antennas and transmission of electromagnetic signals carrying information, + understand the theory of antennas and electromagnetic wave propagation in a uniform way, in order to use them in the analysis and design of wireless telecommunications, + describe the basic mechanisms of radio wave propagation and understand the interaction of electromagnetic waves with the environment, + be aware of the wave propagation phenomena caused in the real environment and the measurement methods used in practice,

	+ calculate and measure the basic antenna parameters and characteristics (eg radiated power, radiation intensity, directivity, gain, radiation resistance), + compare antenna characteristics (advantages/disadvantages), deciding which is the most suitable antenna for each practical application, + perform antenna and electromagnetic radiation measurements, + familiarize with various practical antenna devices, + calculate the radiation diagram of an antenna, when its current distribution is known, + evaluate propagation models and select the appropriate model for calculating losses in a telecommunications link, + prepare radio coverage studies, + be informed about the latest developments in the field of wireless and personal communication systems, + analyze and design wireless telecommunication systems according to the respective needs, + be ready to supervise and maintain wireless telecommunications systems. The course is at the core of the Electronic/Telecommunications Engineer postgraduate curriculum. Note: The project-based version of the course will help the Erasmus students to get many of the above mentioned learning outcomes.
Contents	The project-based version of the course will cover many of the following subjects: Review of electromagnetic theory. Electric, magnetic, electromagnetic fields. Description of electromagnetic phenomena. Maxwell's equations. Wave equations. Boundary conditions. Electromagnetic field power and energy. Poynting vector. Scalar and vector potentials. Fields of sinusoidal time change. Planar electromagnetic waves [polarization, wave propagation in conductive and non-conductive media, phase and group velocities, reciprocity]. Reflection and refraction of planar waves [Snell's law, Fresnel equations, reflection and transmission coefficients, normal and oblique incidence on perfect dielectric and lossy media, standing waves, incidence on dielectric plates, scattering]. Propagation and attenuation of electromagnetic waves. Polarization. Electromagnetic waves in free space. Transmission line theory. Transverse and sinusoidal time-varying waves in transmission lines. Characteristic impedance and complex resistance in transmission lines. Smith chart. Standing waves in transmission lines without losses. Propagation constant and speed in transmission lines. Load matching in transmission lines using λ/4 transformers, one or two short-circuited stubs, or non-uniform transmission lines. Non-periodic phenomena in transmission lines. Coupled transmission line analysis. Wired transmission line types (two-wire or coaxial lines). Phase and amplitude distortion. Balanced and unbalanced lines. Phone network. Phase instability, cross-talk, impact noise, structured cabling.

	Waveguiding. Guided waves and waveguide modes. Parallel-plate waveguide. Description of waves. Separation of variables method. TE, TM, TEM modes. Radial description of wave propagation. Propagation and waveguide losses. Waveguides of rectangular cross section. Wave equation solution. Cutoff conditions. Boundary conditions. Field components in Cartesian coordinates. TM and TE modes. Excitation, characteristic resistance and attenuation of rectangular waveguide modes. Rectangular waveguide resonator. Waveguides of circular cross section. Wave equation solution. Cutoff conditions. Boundary conditions. Field components in cylindrical coordinates. TM and TE modes. Excitation, characteristic resistance and attenuation of circular waveguide modes. Polarization. Circular waveguide resonator. Coaxial waveguide. TEM, TM and TE modes. Microstrip and stripline. Radial and field description of a dielectric layer waveguide. Dielectric layer and dielectric strip. Graded-index strips. Uniform and non-uniform circular optical fiber. Special types of waveguides. Propagation in lines of parallel conductors. Mode excitation. Dielectric and magnetic materials. Electron motion in ferrites. Magnetization equation. Magnetic susceptibility tensor. Wave propagation in ferrites. Faraday rotation. Ferritic microwave elements. Gyrotron. Isolator. Circulator. YIG filter. Mixing materials with different ε, μ. Waveguiding in rectangular waveguides containing strips of material (ε, μ). Non-linear waveguides and waveguides with discontinuities [propagation in a circular section of a rectangular waveguide, propagation in a rectangular waveguide with helical twist, cylindrical small poles with inductive or capacitive behavior in rectangular waveguides, probes]. Waveguide technical characteristics [metal waveguides, optical fibers, flanges, additional elements of waveguide structures, excitation, resonators, filters]. Analysis of microwave circuits [S-parameters, power, efficiency]. Description of signals in microwave circuits. Microwave multiport networks. Scattering matrices. Bidirectional and symmetrical multiport networks. Magic T coupler. Multiport networks without losses. Directional couplers. Power dividers. Other couplers. Methods of microwave network analysis. Microwave resonant circuits. Microwave filters. Integrated microwave circuits [striplines, microstrips, slotlines, coplanar lines, hybrid MICs]. Passive microwave components [design of lumped resistors-capacitors-inductors, circuits with lumped loads]. Waveguide matching [waveguide resistance, measurement of line resistance at any point, load resistance computation].

	Electron beam interaction with electromagnetic waves. High-power microwave sources [vacuum tubes, operating limits, klystron, magnetron, traveling-wave tube (TWT), gyrotron]. Low-power microwave sources. Semiconductor and solid-state devices [bipolar transistors, microwave transistors, field-effect transistors (FETs), semiconductor oscillators, oscillator modes with electron transfer effects]. Microwave mixing diodes. Tunnel diodes. Gunn diodes. IMPATT diodes. Masers. Microwave communications [microwave circuits, terminal equipment, filters, terminal transceivers and repeaters]. Microwave applications [diagnostic and therapeutic medicine, industrial measurements, speed measurements, ovens and thermal devices]. Biological effects of microwaves [radiation limits, biological phenomena, dielectric properties of the human body, electromagnetic environment]. Millimeter wave communications and applications. Review on telecommunications. Electrical signals. Telecommunication systems. Wired and wireless communications. Frequency spectrum (HF, VHF, UHF, microwaves). Introduction to antenna theory. Antenna and transmission line matching. Radiation mechanisms. Antenna characteristics, radiation diagrams, gain, bandwidth, quality factor. Theory of simple linear antennas. Analysis of antennas with assumed current distributions. Hertz dipole. Applications of electrically small antennas. Linear dipole antennas. Field and radiation pattern, directivity, gain, radiation resistance, active antenna height. Dipole λ/2. Traveling wave antennas. Loop antennas. Antennas above perfect ground. Mirroring and image theory. General analysis of the radiation field of any antenna. Applications. Antenna arrays. Rhombic antenna. Principles of antenna design. Applications. Linear arrays. Uniform linear arrays with small and large number of elements. Polynomial theory of linear arrays. Applications. Superdirective antennas. Phase detection. Methods of radiation pattern synthesis. Dolph-Chebyshev linear arrays. Composition of linear arrays with Fourier sums. Applications and examples of antenna analysis and synthesis. Antenna applications and measurements. Aperture antennas. Radiation from flat surfaces. Radiation from rectangular surfaces. Horn antennas. Parabolic reflector antennas. Horn-reflector antennas. Lens antennas. Passive reflectors.

	Input antenna resistance. Equivalent sources. Magnetic charges and currents. Voltage and current sources. Reciprocity theorem. Self-impedance of conductive antennas. Voltage induced on open-ended antenna by an incident field. Induced electromotive force method. Transmission and reception equivalent circuits. Dipole near field. Bandwidth. Receiving antennas. Antenna polarization. Noise in telecommunication systems and antenna noise temperature. Dipole self-impedance. Antenna as terminal impedance. Asymmetric excitation of dipoles. Matching conditions and maximum transmitted power. Matching using stubs. Folded dipole. Mutual complex resistance between dipoles. Antenna array excitation impedance. Impedance of dipoles above perfect ground. Antenna feeding with appropriate currents. Yagi-Uda antennas. The antenna as a receiver. Equality of mutual complex resistances. Equality of transmission and reception radiation patterns. Equality of transmission and reception self-impedances. Equality of transmission and reception antenna active heights. Active antenna surface. Received to transmitted power ratio. Transmission of waves in free space. Friis equation. Losses and maximum transmission distance. Radar equation. Propagation of electromagnetic waves in the earth environment. Ground reflection of obliquely incident plane waves with vertical or parallel polarization. Brewster angles. Ground wave. Space wave. Surface wave. Antennas elevated above ground level. Approximate relationship for propagation at very high frequencies. Near ground surface wave tilt and polarization. Spherical earth. Effects of the earth's curvature. Line-of-sight condition. Barrier effects in wave propagation. Diffraction links. Tropospheric refractive index. Tropospheric propagation, refraction, waveguiding, scattering. Radio horizon. Multiple routes. Intervals. Differential reception systems. Atmosphere attenuation. Critical frequency and ionosphere changes. Ionospheric propagation, refraction, reflection, scattering. Applications. Calculation of radio links. Over sharp obstacle links. Line-of-sight links. Above perfect ground links. Technical characteristics and practical applications of wireless links.
Course type	Project-based (exclusively)
Assessment	Final project evaluation. Blended learning using synchronous and asynchronous methods.
Bibliography	***Related to Microwave and Millimeter-Wave Communications, Technology and Applications*** • A.S. Khan and S.K. Mukerji, *Electromagnetic Fields: Theory and Applications*, CRC Press, 2020. • J.P. Dunsmore, *Handbook of Microwave Component Measurements: With Advanced VNA Techniques*, Wiley, 2020 (2nd Edition), ISBN-10: 1119477131.

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- D.K. Misra, *Radio-Frequency and Microwave Communication Circuits: Analysis and Design*, Wiley-Interscience, 2004 (2nd Edition), ISBN-10: 9780471478737.
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- A.E. Fantom, *Radio Frequency and Microwave Power Measurement*, IET, 1990, ISBN-10: 0863411207.
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- C. Parini, S. Gregson, J. McCormick, D.J. van Rensburg, and T. Eibert, *Theory and Practice of Modern Antenna Range Measurements*, SciTech Publishing, 2021 (2nd Edition), ISBN-10: 1839531282.
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DEPARTMENT OF ACCOUNTING AND FINANCE

School of Management and Economics Sciences

DEPARTMENT OF ACCOUNTING AND FINANCE
HERAKLION

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	Financial Risk Management
ECTS	6
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	*Aims* Learning the concept of Financial Risk and Risk assessment techniques. Contents: Concepts of Financial risk. Market Risk. Credit Risk. Interest Rate Risk. Currency Risk. Operational Risk. Liquidity Risk. Equity risk and portfolio. The Basel Committee. Calculating VaR (Value at Risk). Risk assessment techniques. Calculation of risk in financial derivatives. shares and portfolios (with examples). Risk Management: Lessons from the recent crisis.
Learning Outcomes	By the end of the course students should be able to understand the importance of financial risk and VaR methods.

Prerequisites	None
Assessment	100% Individual Assignment
Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor
Recommended Literature	*1.* *Saunders*, A. and *Cornett*, M.M. (2018) Financial Institution Management—A Risk Management Approach. 8th Edition, McGraw Hill Irwin, New York. https://www.mheducation.com/highered/product/financial-institutions-management-risk-management-approach-saunders-cornett/M9781259717772.html 2. Steve L. Allen, Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk **(Wiley Finance)**

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	Corporate Finance II
ECTS	6
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	Students learn how to use financial analysis for control, financial programming, choices of financing and the effect of capital structure on the value of the stock and the dividend policy. Contents: Use of financial programming. Financial and Operational leverage. Break even point. Use of financial ratios in the evaluation of firm performance. Capital structure and how it affects the value of the stock. Optimal capital structure. Risk measurement and cost of capital. Short term and long term financial planning. Management of Working Capital. Dividend policy. Venture Capital, Leasing, Mergers and Acquisitions. Sources of financing.
Learning Outcomes	By the end of the course students should be able to understand: • The importance of short term and long term financial programming. • The effect of leverage on profitability and value of stock. •The use of financial ratios. •The efficient management of Working Capital. •Dividend policy decisions •Mergers and Acquisitions
Prerequisites	None
Assessment	100% Individual Assignment

Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor
Recommended Literature	1. BerkJ, DeMarzo, Harford, Fundamentals of Corporate Finance, Pearson, https://www.pearson.com/us/higher-education/product/Berk-Fundamentals-of-Corporate-Finance-3rd-Edition/9780133507676.html 2. R. Brealey and S. Myers, **Principles of Corporate Finance**, Mc Graw Hill 3. Ross, Westerfield and Jaffe, **Corporate Finance**, Mc Graw Hill Intern. https://www.mheducation.com/highered/product/corporate-finance-ross-westerfield/M9781259918940.html

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	**Derivatives Products and Hedging Techniques**
ECTS	6
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	***Aims*** Learning the concept of derivatives and mechanisms of derivatives markets. Contents: Basic Concepts of Financial Derivatives. Methods of Pricing and Hedging Futures positions, Forwards, Options and other derivatives. Interest Rates futures and Duration. Stock Options. Strategies in Options. Pricing futures contracts. Options on stock indices. Forward exchanges Futures and Options.
Learning Outcomes	By the end of the course students should be able to understand: The importance of financial futures and options, hedging techniques, and pricing methods.
Prerequisites	None
Assessment	100% Individual Assignment
Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor
Recommended Literature	John C. Hull **Options, Futures, and Other Derivatives** CD Package, https://www.pearson.com/us/higher-education/product/Hull-Options-Futures-and-Other-Derivatives-8th-Edition/9780132164948.html

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	Portfolio Management
ECTS	5
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	Students learn how to use financial models (CAPM, APT) and portfolio valuation theories in financial decision making. Contents: The methods of calculating return on investment. Investment risk, risk premium and the cost of capital. The types of risks and their characteristics. The methods of determining and calculating investment risks. The diversification of risk and the performance of the investment portfolio. Modern risk management models. Theories of portfolio valuation and risk analysis. The capital assets pricing model (Capital Asset Pricing Model) and the theory of investment valuation (Asset Pricing Theory). Modern theories of portfolio valuation and risk analysis. The efficient market hypothesis, the importance of market efficiency for investment decisions, methods of estimation of market efficiency. Stages of investment portfolio management, the behavior of listed securities (variable, constant, procyclical). The defensive / aggressive and passive / active investment strategies.
Learning Outcomes	To help students understand investors needs and make them capable to perform effective analysis and management of portfolio investments.
Prerequisites	None
Assessment	100% Individual Assignment
Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor

Recommended Literature	1. *Elton, E. J., Gruber, M. J., Brown, S. J., & Goetzmann, W. N.* Modern portfolio theory and investment analysis. (9th ed.) John Wiley & Sons. https://www.wiley.com/en-us/Modern+Portfolio+Theory+and+Investment+Analysis%2C+9th+Edition-p-9781118469941 2. Reilly, K. F. and Brown, C. K. (1986) Investment Analysis and Portfolio Management, https://www.cengage.co.uk/books/9781305262997/

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	Special Topics in Financial Management
ECTS	6
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	*Aims* Understanding of special topics in Financial Management (with an emphasis on quantitative analysis). Contents: Topics in Financial Management: Behavioral Finance, Market Efficiency, Volatility of stock market returns. Performance of portfolios and stock products (extensions of CAPM, Greeks & VaR), Examples in Excel and EViews.
Learning Outcomes	By the end of the course students should be able to understand the importance of Modern techniques with applications to Behavioral Finance theories and Financial Markets.
Prerequisites	None
Assessment	100% Individual Assignment
Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor
Recommended Literature	1. Zvi B., Kane, A., Marcus, A. J., Investments, McGraw Hill. 2019 https://www.mheducation.ca/ise-essentials-of-investments-9781260288391-can-group 2.

	Forbes, W. Behavioural Finance, 2009, John Wiley & Sons Ltd.

Hellenic Mediterranean University School of Management and Economics Sciences Department of Accounting and Finance	
Course Title	Corporate Finance I
ECTS	5
Level of Studies	Undergraduate
Tutor	Dr. Christos Floros, Professor
E-mail	cfloros@hmu.gr
Brief Description	Students learn how to use capital budgeting and weighted Average Cost of Capital techniques in decision making. The student learns the time value of money, valuing bonds and stocks and the cost of capital derived from those models. Use of capital budgeting methods, using discounting cash flow analysis, focusing on the methods of NPV and IRR, calculation of projected Free Cash Flows to Firm (FCFF), under conditions of certainty and uncertainty. The student is introduced to the concept of risk and the calculation of risk factor in capital budgeting through the coefficient of variation, CAPM and scenario analysis. Calculation of the weighted average cost of capital, its interpretation and its use in company valuation. Capital budgeting under inflation and under conditions of risk. Cost of capital, cost of debt.
Learning Outcomes	By the end of the course students should be able to understand: • The importance of capital budgeting techniques in long term financial decision making • The use of average cost of capital in project evaluation • Estimation of the value of the firm.
Prerequisites	None

Assessment	100% Individual Assignment
Teaching / Learning Methodology	Lectures Independent learning Office meetings with the tutor
Recommended Literature	1. BerkJ, DeMarzo, Harford, Fundamentals of Corporate Finance, Pearson, https://www.pearson.com/us/higher-education/product/Berk-Fundamentals-of-Corporate-Finance-3rd-Edition/9780133507676.html 2. R. Brealey and S. Myers, **Principles of Corporate Finance**, Mc Graw Hill 3. Ross, Westerfield and Jaffe, **Corporate Finance**, Mc Graw Hill Intern. https://www.mheducation.com/highered/product/corporate-finance-ross-westerfield/M9781259918940.html

DEPARTMENT OF AGRICULTURE

School of Agricultural Sciences

Description of (B.Sc) courses offered in English

Erasmus Departmental Coordinator: Assist. Professor Konstantinos Paschalidis kpaschal@hmu.gr

Department of Agriculture									
Module Code	X	Module Title	Number of teaching hours/week				ECTS	Semester	Responsbile
			T	PS	L	Total			
0810.1.002.0	C	Plant Anatomy & Morphology	3		2	5	6	1st	D. Kollaros kollaros@hmu.gr
0810.2.001.0	C	Genetics	3	1		4	5	1st	K. Paschalidis kpaschal@hmu.gr
0810.3.001.0	C	Plant Physiology	3		2	5	5	3rd	K. Loulakakis and /or Pschalidis loulakak@hmu.gr
0810.3.005.0	C	Soil Science	3		2	5	5	3rd	V. Tzanakakis vetzanakakis@gmail.com
0810.3.006.0	C	Field Crop Production I (Gramineae and Leguminosae)	3		2	5	5	3rd	K. Paschalidis kpaschal@hmu.gr
0810.5.006.0	C	Plant Breeding	3		2	5	5	5th	K. Paschalidis kpaschal@hmu.gr
0810.7.017.0	E	Field Crop Production II (Industrial and Energy Crops)	2		2	4	5	8th	K. Paschalidis kpaschal@hmu.gr
0810.1.001.0	C	Introduction to Agricultural Sciences	3	1		4	4	1st and 2nd	K. Paschalidis kpaschal@hmu.gr
0810.6.007.0	C	Soil Microbiology	3		2	5	4	6th	Anastasia Tampakaki

									atampakaki@hmu.gr
0810.7.021.0	CE	Sustainable Management of Biotic Resources in Agriculture	3	1		4	5	7th	Anastasia Tampakaki atampakaki@hmu.gr
0810.9.001.0	C	Apiculture	3		2	5	5	8th	E. Alissandrakis ealiss@hmu.gr

Abbreviations: **T:** Theory, **PS:** Practical sessions, **L:** Lab. **Course type (X): C:** Compulsory, **CE:** Compulsory Elective, **E:** Elective

Department	Agriculture
Course Code	04105
Course Title	Plant Anatomy & Morphology
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	1
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Professor Demetrios KOLLAROS, email: kollaros@hmu.gr
Lecturer personal webpage	
Learning Outcomes	The course aims to understand the basic knowledge of cytology and histology of plants. Particularly, it examines the major subcellular structures, the division of cells, of various tissues, of anatomical structure and external morphology in plant organs, such as stem, leaf, root, flower, fruit and seeds.
Prerequisites	No prerequisites

Course Contents	Introduction to Plant Biology, origin and development of plants, prokaryotes and eukaryotes, the molecular composition of the plant, the plant cell protoplasm and cytoplasm, cell membranes, ribosomes, intramembranous system, mitochondria, plastids, nucleus, cell wall, vacuoles, savings products, cell division (mitosis, meiosis), cells and tissues of the plant body (e.g. parenchyma, collenchyma, xylem-phloem, secretory cells and tissues), organization of the plant body stem, primary structure and development , secondary growth, leaf, root primary structure, flower, inflorescences, fruits, seeds, plant propagation, asexual reproduction, dormancy, germination.

Department	Agriculture
Course Code	04205
Course Title	Genetics
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	2
ECTS credits	5

Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Konstantinos Paschalidis mail: kpaschal@hmu.gr
Lecturer personal webpage	https://www.hmu.gr/agro/el/kpaschalhmugr
Learning Outcomes	The course provides the necessary information and methodology to: 1. Introduce students to the fundamental principles of genetics in agriculture and biology. 2. Make students understand the central concepts of agricultural genetics and their components. 3. Make students capable in understanding the Mendelian approach that reflects the dynamic nature of modern genetics by emphasizing an experimental, inquiry-based approach with a solid treatment of many research experiments.
Prerequisites	No prerequisites

Course Contents	The course includes the following major units: Introduction to Genetics, Mendelian Genetics, Chromosomal Basis of Inheritance, Extensions of Mendelian Genetic Principles, Quantitative Genetics, Gene Mapping in Eukaryotes, Advanced Gene Mapping in Eukaryotes, Variations in Chromosome Structure and Number, Genetics of Bacteria and Bacteriophages, DNA: The Genetic Material, DNA Replication, Gene Control of Proteins, Gene Expression: Transcription, Gene Expression: Translation, DNA Mutation, DNA Repair, and Transposable Elements, Recombinant DNA Technology, Applications of Recombinant DNA Technology, Genomics, Regulation of Gene Expression in Bacteria and Bacteriophages, Regulation of Gene Expression in Eukaryotes, Genetic Analysis of Development, Non-Mendelian Inheritance, Population Genetics, Molecular Evolution.
Recommended reading	- iGenetics: A Mendelian Approach Peter J. Russel Publisher: Benjamin Cummings; 1 edition (April 14, 2005) Language: English ISBN-10: 080534666X, ISBN-13: 978-0805346664. //o Introduction to Genetic Analysis (INTRODUCTION TO GENETIC ANALYSIS (GRIFFITHS)) by Anthony J.F. Griffiths, Susan R. Wessler, Sean B. Carroll and John Doebley (Dec 24, 2010) Publisher: W. H. Freeman; Tenth Edition edition (December 24, 2010) Language: English ISBN-10: 1429229438, ISBN-13: 978-1429229432.

Department	**Agriculture**
Course Code	**04202**
Course Title	**Plant Physiology**
Level	**First cycle (bachelor)**
Type of Course	**Compulsory**
Semester	**2**
ECTS credits	**5**
Language	**Greek and English**
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Professor Konstantinos Loulakakis mail: loulakak@hmu.gr
Lecturer personal webpage	
Learning Outcomes	The purpose and aim of the course: the aim of the course is the understanding of the physiological and biochemical functions of plants in all stages of construction as subcellular units, cells, tissues, organs, and body as well as the determination of the causes that trigger the vital events and activities. Knowledge of physiological function of these plants is a prerequisite for increasing the main consumer products (cereals, vegetables, Ornamentals, nurseries) or industrial products (medicines, timber, essential oils).

Prerequisites	Plant Anatomy and Morphology
Course Contents	Structure and architecture of the plant and of the cell, the cell's organization in conjunction with the functional action, the molecular composition of plants, energy and enzymes, water and plant cells, water economy in plant nutrients and their participation in the process of metabolic circuit, photosynthesis, respiration, lipid metabolism, physiology of transport in the phloem, assimilation of inorganic nutrients, regulated growth, development and diversification, vegetable hormones, aging and Programmed Cell Death, control of the development of external reasons (temperature, tropism, photoperiodism , lythargos).
Recommended reading	"Plant Physiology Volume A" Textbook, TSEKOS JOHN, 2003 PUBLISHING HOUSE Kyriakidis Brothers SA "Introduction to Plant Physiology" Textbook, TSEKOS JOHN, ELIAS ELIAS, 2006 PUBLISHING HOUSE Kyriakidis Brothers

Department	Agriculture
Course Code	04201
Course Title	Soil Science
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	2
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Vassilis Tzanakakis Mail: vetzanakakis@gmail.com
Lecturer personal webpage	
Learning Outcomes	The purpose and aim of the lesson: The lesson of soil science is a basic lesson in all areas of School Of Agricultural Technologists. The purpose of this course is knowledge of the soil as a natural resource of the Earth's surface, the study of Genesis, classification and mapping of soils and the study of physical, chemical and biological properties.

Prerequisites	No prerequisites
Course Contents	General knowledge of soil, the factors that affect the growth of plants, the mineralogical composition of soil colloids of soil physical and chemical properties of this. B. soil nutrients, organic matter, soil capability, alternative acidity and alkalinity soils. C. General knowledge about fertilizers, soil microbiology and the classification of soils.
Recommended reading	Soil Science Kuriakos P. Panagiotopoulos

Department	Agriculture
Course Code	04505
Course Title	Cereals - Legumes
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	5
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Konstantinos Paschalidis Mail: kpaschal@hmu.gr
Lecturer personal webpage	https://www.hmu.gr/agro/el/kpaschalhmugr

Learning Outcomes	The purpose and aim of the course: To help students obtain, in the direction of Agriculture, the necessary specific knowledge about the usefulness, morphological characteristics, ecological requirements, the growing techniques and the maintenance of products of winter and spring cereals and legumes.
Prerequisites	General agriculture
Course Contents	Outline: utility, morphological characteristics, ecological requirements, crop production, crop silage, hay and fresh maintenance of products of winter-spring cereals and fruitful leguminous. Furthermore, the most important insects, diseases, weeds and their manipulating methods are also briefly outlined.
Recommended reading	"Special Agriculture - Cereals and Legumes" Textbook, D. PAPAKOSTA-Tasopoulou, 2012, ISBN: 978-960-357-105-6, Christina and Vassiliki Kordali AE

Department	Agriculture
Course Code	04601
Course Title	Plant Breeding
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	6
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Konstantinos Paschalidis Mail: kpaschal@hmu.gr
Lecturer personal webpage	https://www.hmu.gr/agro/el/kpaschalhmugr

Learning Outcomes	The course provides the necessary information and methodology to: 1. Introduce students to the fundamental principles of plant breeding. 2. Make students understand the central concepts of plant breeding and their components. 3. Make students capable in applying tools in plant Breeding, such as sexual hybridization, tissue culture, polyploidy and biotechnology.
Prerequisites	Genetics
Course Contents	The course includes the following major units: Underlying science and methods of plant breeding, Historical perspectives and importance of plant breeding, The art and science of plant breeding, Plant cellular organization and genetic structure: an overview, Plant genetic resources for plant breeding, Genetic analysis in plant breeding, population genetics, quantitative genetics, Common statistical methods in plant breeding, Tools in plant breeding, Sexual hybridization and wide crosses in plant breeding, Tissue culture and the breeding of clonally propagated plants, Polyploidy in plant breeding, Biotechnology, Classical methods of plant breeding, Selected breeding objectives, Breeding for physiological and morphological traits, Breeding for resistance to diseases and insect pests, Breeding for resistance to abiotic stresses, Performance evaluation for crop cultivar release, Seed certification and commercial seed multiplication.

Recommended reading	Fanourakis Nikolaos, 2005, ISBN: 978-960-411-540-2, STELLA PARIKOU & CO AE A. TSAFTARIS, EIR. NIANOU, A.POLYDOROS, 2012, ISBN: 978-960-357-103-2, Christina and Vassiliki Kordali OE Roupakias Dimitrios, 2010, ISBN: 978-960-12-1972-1, University Studio Press Inc. - http://www.agri.ankara.edu.tr/fcrops/1289__BITKI_GENETIGI_VE_ISLAH.pdf //o An Introduction to Plant Breeding. Jack Brown and Peter Caligari. 2008. Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK. 209 p. ISBN: 978-1-4051-3344-9 //o http://www.bspb.co.uk/BSPB%20Handbook.pdf

Department	Agriculture
Course Code	04502
Course Title	Industrial - Energy Plants
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	5
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects

Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Konstantinos Paschalidis Mail: kpaschal@hmu.gr
Lecturer personal webpage	https://www.hmu.gr/agro/el/kpaschalhmugr
Learning Outcomes	The purpose and aim of the course: To provide students with the necessary knowledge about the usefulness, morphological characteristics, ecological requirements, the growing techniques and the maintenance of important products to Greek agricultural industrial and energy plants.
Prerequisites	No prerequisites
Course Contents	Utility, morphological characteristics, ecological requirements, crop production, crop maintenance and the technology of industrial and energy plant products, such as tobacco, cotton, sugar beets, potatoes and tomatoes. Furthermore, the most important insects, diseases, weeds and their manipulating methods are also briefly outlined.
Recommended reading	Industrial Plants, Papakosta-Tasopoulou, ISBN: 978-960-357-049-4, Christina and Vassiliki Kordali AE Galanopoulou-Sendouka Stella, ISBN: 960-351-430-6, Stamoulis AE

Department	Agriculture
Course Code	04104
Course Title	Introduction to Agronomy
Level	First cycle (bachelor)
Type of Course	Compulsory
Semester	1
ECTS credits	5
Language	Greek and English
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Konstantinos Paschalidis Mail: kpaschal@hmu.gr
Lecturer personal webpage	https://www.hmu.gr/agro/el/kpaschalhmugr
Learning Outcomes	The course provides the necessary information and methodology to: 1. Introduce students to the fundamental principles of scientific agriculture. 2. Make students understand the concepts of agricultural systems and their components. 3. Examine the relationship of agriculture to human survival and human interactions, the place of agriculture in human history and how it relates to population growth and the roles that the consumption and production of food and fiber play in society.

Prerequisites	No prerequisites
Course Contents	The course includes the following major units: Principles underlying practices used in the culture of, mostly, grain and forage crops. Crop classification, structure, growth, and improvement. Crop response to environmental factors, soils, and pests and associated management practices. Laboratories will cover crop botany, crop development, and problem solving. A basic course for majors in agronomy and others interested in crop production.
Recommended reading	Courses in General Agriculture, CHRISTOS DORDAS, ISBN: 978-960-357-088-2, Christina and Vassiliki Kordali OE - http://www.freebookcentre.net/biology-books-download/Basics-ofAgriculture.html //o Agricultural Science by Godwin Aflakpui Publisher: InTech 2012 ISBN-13: 9789535105671 http://www.e-booksdirectory.com/details.php?ebook=7450

Department	**Agriculture**
Course Code	**0810.1.001.0**
Course Title	**INTRODUCTION TO AGRICULTURAL SCIENCES**
Level	**First cycle (bachelor)**
Type of Course	**Compulsory**
Semester	**1**

ECTS credits	**5**
Language	**Greek and English**
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Associate Professor Konstantinos Paschalidis, email: kpaschal@hmu.gr
Lecturer personal webpage	https://agro.hmu.gr/en/academic-staff/paschalidis-konstantinos-associate-professor
Learning Outcomes	The course provides the necessary information and methodology to: 1. Introduce students to the fundamental principles of scientific agriculture. 2. Make students understand the concepts of agricultural systems and their components. 3. Examine the relationship of agriculture to human survival and human interactions, the place of agriculture in human history and how it relates to population growth and the roles that the consumption and production of food and fiber play in society.
Prerequisites	No prerequisites
Course Contents	Principles underlying practices used in the culture of, mostly, grain and forage crops. Crop classification, structure, growth, and improvement. Crop response to environmental factors, soils, and pests and associated management practices. Laboratories will cover crop botany, crop development, and problem solving. A basic course for majors in agronomy and others interested in crop production.
Recommended reading	1. Courses in General Agriculture, CHRISTOS DORDAS, ISBN: 978-960-357-088-2, Christina and Vassiliki Kordali OE - Language: Greek. 2. Agricultural Science, Godwin Aflakpui Publisher: InTech 2012 ISBN-13: 9789535105671 http://www.e-booksdirectory.com/details.php?ebook=7450 Language: English. 3. Introduction to Agronomy. Larsen and Keller Education (2017) ISBN-10: 1635490200. ISBN-13: 978-1635490206. 4. A TEXTBOOK OF AGRONOMY B. Chandrasekaran, K. Annadurai, E. Somasundaram 2010 https://ia803400.us.archive.org/33/items/Agronomy/A%20Textbook%20of%20Agronomy.pdf Language:

	English. 5. Modern Agronomy. Syrawood Publishing House (2020) ISBN-10: 1682868494. ISBN-13 : 978-1682868492 Language: English

Department	**Agriculture**
Course Code	**0810.6.007.0**
Course Title	**SOIL MICROBIOLOGY**
Level	**First cycle (bachelor)**
Type of Course	**Compulsory**
Semester	**6**
ECTS credits	**4**
Language	**Greek and English**

Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Associate Professor Anastasia Tampakaki, email: atampakaki@hmu.gr
Lecturer personal webpage	https://agro.hmu.gr/en/academic-staff/tampakaki-anastasia-associate-professor
Learning Outcomes	Upon completion of this course each student will be able to: - understand the importance of microorganisms in the soil and to be informed about the latest developments in soil microbiology. - understand the contribution of microorganisms to soil fertility and to understand the factors responsible for soil health and to learn how to keep soils healthy in the context of sustainable agriculture. - obtain useful information on the taxonomic, physiological and environmental aspects of soil microorganisms. - understand the role of microbial populations in the soil, such as the decomposition of dead organic matter, soil enrichment with nutrients, increasing water penetration, improving soil texture, etc. - gain knowledge about soil microorganisms that are both harmful and beneficial and how to control and strengthen each, respectively. - learn the types of interactions that develop between microorganisms (e.g., symbiotic nitrogen fixation, mycorrhiza, competition as well as with other categories of organisms (e.g., plants). - understand the metabolic processes through which microorganisms affect the productivity, quality and function of the soil ecosystem. - understand and interpret the agricultural and environmental effects of soil microorganisms in applications such as biological control of phytopathogens, biodegradation and bioremediation of pollutants, etc. - understand how anthropogenic activities and other factors (e.g. climate change) affect the presence, growth, distribution, abundance and activity of microorganisms in the soil and consequently the functioning of the ecosystem. - develop skills in the application of techniques and methodologies for the isolation, characterization and identification of soil microorganisms. - understand and interpret data in the context of soil microbiology as well as develop skills in oral and written presentation of research data and measurements.

	- enhance the ability of students to perform their duties as future employees in the fields of Agricultural and Environmental Sciences.
Prerequisites	No prerequisites
Course Contents	The course includes the following major units: - Introduction-Historical framework of Soil Microbiology- The soil and rhizosphere microbiome. - Soil microorganisms (Bacteria, Ancient, Fungi, Viruses, Primary) - Metabolic diversity of soil microorganisms. - Microbial metabolism of nitrogen in the soil (ammonization, nitration denitrification), Symbiotic and non-symbiotic nitrogen fixation. - Microbial metabolism of sulfur, phosphorus, iron, etc. in the soil - Microbial interactions in the soil (symbiosis, competition, etc., bio-communication of microorganisms). Interactions of plants and soil microorganisms (rhizosphere, sperm sphere, bio-communication of plants-microorganisms). - Soil microorganisms that promote plant growth and health. - Biological control of soil phytopathogenic microorganisms. - Biodegradation and bioremediation of organic pollutants in the soil. - Microbiology of degraded / suppressive soils. - Methods for determination and analysis of microbial diversity in the soil. - The effects of climate change on soil microbial communities.
Recommended reading	Principles and applications of soil microbiology, Third edition, 2021. Edited by Terry J. Gentry, Jeffry J. Fuhrmann, David A. Zuberer, Elsevier Inc. Environmental microbiology. 3rd. edition. 2014. Ian L Pepper, Charles P Gerba, Terry J Gentry. Academic Press. Modern Soil Microbiology by Jan Dirk van Elsas (ed.), Jack T. Trevors, 3rd edition, 2019 Environmental Microbiology. 2009. Raina M. Maier, Ian L. Pepper and Charles P. Gerba. Academic Press.

	Lessons in Environmental Microbiology. 2019. Roger Tim Haug. CRC Press. Taylor & Francis Group. Soil Microbiology, 3rd edition. 2021. Robert L. Tate III, Wiley-Blackwell. Soil Microbiology, Ecology and Biochemistry, 4th edition. 2015. Eldor A. Paul. Elsevier Inc. Madigan M.T., Martinko J.M., Parker J. 2018. BROCK: Biology of Microorganisms

Department	**Agriculture**
Course Code	**0810.7.021.0**
Course Title	**SUSTAINABLE MANAGEMENT OF BIOTIC RESOURCES IN AGRICULTURE**
Level	**First cycle (bachelor)**
Type of Course	**Compulsory elective**
Semester	**7**
ECTS credits	**5**

Language	**Greek and English**
Teaching methods	Lectures, and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Associate Professor Anastasia Tampakaki, email: atampakaki@hmu.gr
Lecturer personal webpage	https://agro.hmu.gr/en/academic-staff/tampakaki-anastasia-associate-professor
Learning Outcomes	Upon completion of this course each student will be able to: - understand the importance of the plant microbiome in plant growth, productivity and health, - obtain and seek useful information on the methodologies of modern and classical methods of plant microbiome analysis, - understand the importance of utilizing microorganisms in improving soil fertility, enhancing plant growth and nutrition in plant protection against plant diseases and pests and plant resistance to abiotic stress (eg drought, salinity, etc.), - gain knowledge about the methods of management of rhizosphere microorganisms, - know the different categories of biofertilizers-microbial inoculants, and their characteristics, - understand the prospects and difficulties of using biofertilizers-microbial inoculants and to become familiar with the methodologies of their development, production and application in agriculture, - acquire knowledge about the methodologies applied for the commercial production of microbial vaccines, - know the different categories of microbial pesticides and their characteristics, - gain knowledge about the advantages and disadvantages of applying microbial pesticides for a sustainable agriculture, - understand the importance of utilizing microorganisms in agricultural systems, environmental applications and in the production of products on an industrial scale, - record, present and analyze research results,

	- combine and correlate research results with the relevant literature in order to be able to evaluate, interpret and propose sustainable solutions for a sustainable agriculture.
Prerequisites	No prerequisites
Course Contents	The course includes the following major units: - Plant Microbiome, - The plant microbiome as a source for new chemical compounds for the Pharmaceutical-Agro-industry, - Beneficial microorganisms in Agriculture, - Modern and classic methods of analysis of the plant microbiome, - Biofertilizers-Microbial inoculants: What they are, categories of microbial inoculants, advantages / disadvantages of use, commercial formulations. - Methodologies for the development, production and application of biofertilizers-microbial inoculants in plants. Limitations of biofertilizer technology and legislation, - Microbial pesticides: Biological control of pests and plant diseases (case studies), - Applications of microorganisms in plant growth and development (case studies), - Applications of microorganisms in plant nutrition (case studies), - Enhancing the resistance of plants to abiotic stresses (e.g .drought, salinity, etc.) with the use of microorganisms (case studies), - Applications of microorganisms in the utilization of plant residues (case studies), - Biodegradation and bioremediation of agrochemicals in the soil (case studies), - Applications of other organizations in the management of Agro-environmental systems.

Recommended reading	Principles and applications of soil microbiology, Third edition, 2021. Edited by Terry J. Gentry, Jeffry J. Fuhrmann, David A. Zuberer, Elsevier Inc. Environmental microbiology. 3rd. edition. 2014. Ian L Pepper, Charles P Gerba, Terry J Gentry. Academic Press. Modern Soil Microbiology by Jan Dirk van Elsas (ed.), Jack T. Trevors, 3rd edition, 2019 Environmental Microbiology. 2009. Raina M. Maier, Ian L. Pepper and Charles P. Gerba. Academic Press. Lessons in Environmental Microbiology. 2019. Roger Tim Haug. CRC Press. Taylor & Francis Group. Soil Microbiology, 3rd edition. 2021. Robert L. Tate III, Wiley-Blackwell. Soil Microbiology, Ecology and Biochemistry, 4th edition. 2015. Eldor A. Paul. Elsevier Inc.

Department	**Agriculture**
Course Code	**04505**
Course Title	**Apiculture**
Level	**First cycle (bachelor)**
Type of Course	**Compulsory**
Semester	**8**
ECTS credits	**5**
Language	**Greek and English**
Teaching methods	Lectures, Lab exercises and/or projects
Assessment	Written exams and/or project evaluation
Lecturer	Assistant Professor Lefteris Alissandrakis
Lecturer personal webpage	
Learning Outcomes	The acquaintance of students with the basic concepts of beekeeping, description of the bee and analysis of its behavior and activities. Focus on issues related to beekeeping products, their nutritional properties and possible uses by humans. Approach to beekeeping operations and annual planning on a case-by-case basis. The aim is to acquire preliminary, but comprehensive, knowledge about the overall spectrum of beekeeping as a science, with less emphasis on practical beekeeping issues of products of winter and spring cereals and legumes.

Prerequisites	No prerequisites
Course Contents	• Introduction, origin, and evolution • Honeybee anatomy, development and nutrition • Honeybee nest and communication • Honeybee activities • Products of the hive
Recommended reading	• Products of the hive (https://www.bee-hexagon.net/) • Snodgrass, R.E., 1910. The Anatomy of the Honeybee. U.S. Department of Agriculture (https://naldc.nal.usda.gov/download/CAT31027153/PDF) • Seeley, T.D., 1995. The Wisdom of the Hive. HARVARD UNIVERSITY PRESSCambridge, MassachusettsLondon, England (http://beekeeperstraining.com/file2/source/books/69.pdf)

DEPARTMENT OF BUSINESS ADMINISTARION AND TOURSIM

School of Management and Economics Sciences

DEPARTMENT OF BUSINESS ADMINISTRATION AND TOURISM

HERAKLION

Hellenic Mediterranean University School of Management and Economics Sciences Department of Business Administration and Tourism	
Course Title	DESTINATION BRANDING
ECTS	5
Level of Studies	Undergraduate
Tutor	Dr. Nikolaos Trihas, Assistant Professor
E-mail	ntrihas@hmu.gr
Brief Description	This course provides students with a comprehensive review of the main issues and concepts related to destination branding. The course analyzes in theoretical and practical terms the factors that contribute to the competiveness of tourist destinations by placing emphasis on the development of a unique destination brand. The course examines the principles and practices of destination branding, exploring the importance of destination brands. It considers brand management, positioning and various branding models within the tourism and destination context, further exploring issues of brand identity, brand image, brand personality, brand loyalty, brand equity, and brand awareness. It introduces students to the principles and practices of marketing communications and the variety of communication tools available to promote a destination brand. It examines the role of media in the communication of a destination brand (traditional media and digital communication media). It examines the process of planning and executing an integrated destination brand promotion campaign. It examines the role of the various stakeholders involved in destination branding, including destination management organizations (DMOs) and local authorities. It considers the range of approaches to destination branding within the global tourism industry context through a range of case-studies.

Learning Outcomes	A student passing this course should be able to: 1. Define the broad concept of destination branding; 2. Understand the need for implementing destination promotion schemes; 3. Evaluate the role of DMOs in destination branding strategy; 4. Critically analyze destination branding material that is produced by a range of destinations; 5. Formulate an original destination branding strategy; 6. Understand the concept of marketing communications; 7. Develop a draft of a destination brand communication campaign and select adequate media in this campaign.
Prerequisites	None
Assessment	100% Individual Assignment (80% assignment + 20% presentation of the assignment in the class)
Teaching / Learning Methodology	Independent learning Office meetings with the tutor
Recommended Literature	• Ashworth, G. and Kavaratzis, M. (Eds.) (2010), *Towards Effective Place Brand Management. Branding European Cities and Regions.* Cheltenham: Edward Elgar Publishing Limited. • Bayraktar, A. and Uslay, C. (2017), *Strategic Place Branding. Methodologies and Theory for Tourist Attraction*, Hershey: IGI Global. • Kolb, B. (2006), *Tourism Marketing for Cities and Towns: Using Branding and Events to Attract Tourists*, Butterworth-Heinemann. • Kozak, M and Baloglu, Seyhmus (2011,) *Managing and Marketing Tourist Destinations: Strategies to Gain a Competitive Edge*, Oxon: Routledge • Morgan, N., Pritchard, A. and Pride, R. (Eds.) (2004), *Destination Branding. Creating the Unique Destination Proposition* (2nd Ed.), Oxford: Elsevier Butterworth-Heinemann.

	• Morgan, N., Pritchard, A. and Pride, R.(Eds.) (2011), *Destination Brands. Managing Place Reputation* (3rd Ed.), Oxford: Elsevier Butterworth-Heinemann. • Pike, S. (2008), *Destination Marketing: An Integrated Marketing Communication Approach*, Butterworth-Heinemann. • World Tourism Organization (2007), *A Practical Guide to Tourism Destination Management*, Madrid: WTO.

Hellenic Mediterranean University School of Management and Economics Sciences Department of Business Administration and Tourism	
Course Title	STATISTICS I (EC0NOMIC STATISTICS)
ECTS	6
Level of Studies	Undergraduate
Tutor	Argiro Moudatsou-Associater Professor in Economics
E-mail	moudatsou@hmu.gr
Brief Description	The course provides foundation knowledge on quantitative analysis. The students learn to summarize and describe data, calculate probabilities using the binomial, Poisson and normal distributions, construct confidence intervals, perform basic tests of hypothesis, examine two variables for correlation, and use the least squares method for fitting regression equations to a set of data. **1. Statistics and its Applications** 1.1. Descriptive statistics 1.2. Inferential statistics **2. Frequency Distributions and Graphical Representations** 2.1. Summarizing and classifying data 2.2. Class intervals, class limits, and class marks 2.3. Class frequency, relative frequency and cumulative frequency 2.4. Histograms, bar charts and pie charts **3. Populations, Samples and Measures of Location and Variation of Raw and Grouped Data** 3.1. The mean, median and mode 3.2. The range, variance and standard deviation **4. Probability Distributions** 4.1. Random variables and their probability distribution 4.2. The binomial, and the Poisson distributions

	4.3. The normal distribution and its applications **5. Sampling** 5.1. Sampling distribution of the mean 5.2. The central limit theorem **6. Confidence Intervals** 6.1 For one mean 7. Tests of Hypothesis 7.1 For one mean 7.2 For two means (Independent samples case) 7.3 For two means (Dependent samples case) 7.4 For independence of two qualitative/categorical variables. **8 Simple Linear Correlation and Regression**. 8.1 The correlation coefficient, the coefficient of determination and the test of linear relationship between two variables. 8.2 The least-squares method. 8.3 Determine the regression line and use it as a prediction tool. 8.4 Applications using EXCEL **9. Multiple Linear Regression.** 9.1 Determine the equation of a regression plane and use it as a prediction tool. 9.2 Calculation of the coefficient of multiple determination. 9.3 Calculation of the coefficient of partial determination.
Learning Outcomes	Upon successful completion of the course students are expected to have: • Knowledge of basic statistical concepts - and how to present statistical data • Knowledge to describe combine or identify (a) The basic continuous theoretical probability distributions, (b) The concept of sampling and sampling distribution, (c) Estimation of population parameter confidence interval, (d) The process and formulation of controls (e) The concept of the correlation between modeling and the investigation of a causal relationship between socio-economic actors

	Skills related to: (a) in calculating basic statistical measures (b) in, using numerators (c) in calculating linear correlation coefficient and simple regression parameters (d) Using Theoretical distributions (in particular of the Bionomic-distribution and the Poisson distribution) in solving practical problems. • Skills to be able to distinguish, explain or calculate and classify, probabilities of theoretical continuous probability distributions, probability of sampling distributions, population parameter confidence intervals, hypothesis tests, degree of correlation of two variables, parametric estimation, basic statistical evaluation of single and multiple regression models, **Ability to:** • Combine statistical data from companies and calculate key statistics and evaluate results • Be able to solve complex real and possibly unpredictable problems proving the knowledge and skills acquired from the course. To analyze, compose and finally formulate evaluative judgments on statistical issues of companies / organizations
Prerequisites	None
Assessment	Midterm Examination 30% Final Examination 70% The midterm examination is a 1.30 hours written examination on units 1, 2, 3, 4 The final examination is a 2-hour written examination on all units
Teaching / Learning Methodology	Reading Course
Recommended Literature	Len Gill, Chris D. Orme & Denise Osborn (1997-2003) "Statistics for Economists" Enrico Giovannini -OECD: "Understanding Economic Statistics, an OECD perspective" https://www.oecd.org/sdd/41746710.pdf Marcelo Fernandes (2009) "Statistics for Business and Economics"

Information about the course	The course is assisted with material (theories and exercises) that will be posted at regular time intervals in the e-class Course website https://eclass.hmu.gr/courses/BAT189/ Office Hours : Monday 12.00-13.00 (SEDO 1rts flour, room 18)

Hellenic Mediterranean University School of Management and Economics Sciences Department of Business Administration and Tourism	
Course Title	FOOD AND BEVERAGE MANAGEMENT
ECTS	5
Level of Studies	Undergraduate
Tutor	Dr. George Triantafyllou
E-mail	triantafyllou@hmu.gr
Brief Description	Unit-1 : Brief knowledge of: a) Development of catering industry, job prospects and careers in the catering industry. b) Different types of catering establishments. c) Relationship of the waiter with – i) Customer, ii) Kitchen, and iii) Management. Unit-2 : Brief description and correct uses of : a) Different types of cutlery, crockery, silverware, flatware, halloware and glassware used in a standard catering establishment. b) Different types of equipment – Baine Marie, plate warmer, hot plates, microwave oven, ice cream machine, coffee machine, ice cube machine, side boards, dish washing machine, glass washing machine. c) Special equipment – Nut cracker, grape scissors, Oyster service, caviar, lobsters, snails, cheese. Cigar cutters, wine bottle openers, gueridon equipment. d) Different types of restaurant linen, exchange and requisition systems. Unit-3 : Preparation of the restaurant – Mis-en-place & mis-en-scene, rules for laying of table and waiting. Useful tips for Food/Beverage service. Restaurant vocabulary – English and French. Unit-4 : Various forms of a meal courses: Hors d' oeuvres, Potege, Poisson, Entrée, Releve (main), Sorbet, Roti, Legumen, Entrement, Savoury, Desserts and Cafe. Unit-5 : Table Sauces – accompliments/garnishes. Unit-6 : Meals and Menu planning – Different types of Menus – (a) Table d'hote, (b) A'la carte, (c) State Banquets, (d) Buffet – cold/hot spreads, for various types of function.

	Unit-7 : Different forms of service – Russian, American, French, Indian and English. Unit-8 : Staff organisation of F&B Deptt., and inter & intra departmental coordination. Unit-9 : Silver polishing methods – (a) Polivit method, (b) Plate powder, (c) Burnishing method. Unit-10: Significance of pantry & still room in F&B operation, Functions of pantry and sections of pantry. Unit-11: Kitchen stewarding. Broad specifications of light and heavy duty equipment, Restaurant, Pantry and Still room equipment. Unit-11: Modern trends in the Hotel and Catering industry: - Ecotels - Fast Food outlets - Adventure Tourism - Theme Restaurants - Welfare Catering PRACTICALS : Hygienic handling of cutlery, crockery, glassware and trays. Laying and relaying of table cloth during and before meals. Correct use of waiter's cloth runners, Napkins and Napkin foldings. Mise-en-scene and Mise-en-place for various types of meals and menus. Correct handling and practice of service spoons and service forks, silver service. Serving and clearing of a meal (course by course). Table d'hote menus, laying for cover and service for lunch and dinner, preparation & service of tea, black coffee, turkish coffee, cona coffee, espresso coffee. Receiving and seating the guests, presenting menu cards and taking the order from guests and writing of KOT. Passing the order to the Kitchen & pickup. Making and presentation of a bill. Organising parties and functions – Buffets & Banquets. Indian and Chinese food service procedures. Daily briefing and system of tips/distribution.
Learning Outcomes	A Student will be able to: • Will know factors that play role in the development of the food and beverage industry. • Can explain social and economic reasons in the development of food and beverage industry. • Can classify the types of food and beverage operations. • will know the difference of food and beverage operations management. • Explains the management process in the food and beverage operations. • Knows managerial roles.

	• Can explain the cycle of food and beverage. • Can control purchasing, receiving, and storage process. • Makes the production and cost control. • Makes the revenue control • Can explain sales and marketing operations. • Knows the techniques of advertising and personal selling. • Can do promotion and public relations.
Prerequisites	None
Assessment	100% Individual Assignment (100% assignment)
Teaching / Learning Methodology	Independent learning
Recommended Literature	- Cichy Ronald F., Hickey Philip J. Jr., *Managing service in food and beverage operations* - Ninemeier Jack D., *Management of food and beverage operations* - Ninemeier Jack D., *Planning and control for food and beverage operations* - Cousins John, *Food and beverage management.* - Bernard Davis, Andrew Lockwood, Sally Stone, *Food and Beverage Managemen*t - Dittmer Paul R., *Principles of Food, Beverage, and Labor Cost Controls* - Kasavana M., Smith D., (1982), *Menu Engineering - A Practical Guide.* Lansing, - MI: Hospitality Publishers. - Seaberg, A.G., (1983), *Menu design, merchandising and marketing,* Boston, Mass.: CBI..

Hellenic Mediterranean University School of Management and Economics Sciences Department of Management Science and Technology	
Course Title	New Technologies in Marketing
ECTS	5
Level of Studies	Undergraduate
Tutor	Dr. George Mastorakis, Associate Professor
E-mail	gmastorakis@hmu.gr
Brief Description	This course provides an introduction to digital marketing. The course covers all major digital platforms, such as mobile and social media. The following topics are covered: The decision support marketing with the help of IT systems Decision support expert systems Database marketing and CRM (Customer Relationship Management) Marketing and media Marketing and web (online marketing) Development plan for online marketing Web promotion / advertising, web site traffic analysis systems The course also addresses the following key elements of e-marketing: • Traffic statistics (Web Analytics): importance of traffic analysis in the Internet, methods of measurement and analysis software. • Search Engine Optimization (SEO): reference to the Search Engines, in terms of their function and their importance in online marketing, methods and practices for web site optimization for search engines.

	• Promotion through Social Media (Social Media Marketing): methods and practices for carrying out promotional activities through social networks. • Digital Advertisement: web site design for digital forms of advertising, use of interactive display networks. • E-mail marketing: basic techniques for successfully carrying out promotional activities by e-mail.
Learning Outcomes	The objective of this course is to familiarize students with the information management systems in marketing, the e-Marketing technologies and the online Marketing techniques/methods. In addition, this course will expose students to digital marketing mainly for lead generation and retention activities in both business to business and business to consumer environments. By the end of this course, students will have the opportunity to: 1. learn the basics of digital marketing and the importance of the offer, list and creative in response rates 2. develop a comprehensive digital marketing strategy 3. learn through doing how to use new media such as mobile, search and social networking; learn the measurement techniques used in evaluating digital marketing efforts 4. learn the importance of ongoing reading and following of industry publications given the dynamic and rapidly changing digital landscape 5. understand and know the ethical and legislation impacting digital marketing
Prerequisites	None
Assessment	100% Individual Assignment
Teaching / Learning Methodology	Independent learning Office meetings with the tutor
Recommended Literature	• Agrawal, Smita. "The impact of emerging technologies and social media on different business (es): Marketing and management." In Maximizing Business Performance and Efficiency Through Intelligent Systems, pp. 37-49. IGI Global, 2017.

- Huang, Ming-Hui, and Roland T. Rust. "A strategic framework for artificial intelligence in marketing." Journal of the Academy of Marketing Science 49, no. 1 (2021): 30-50.
- Krasnov, Alex, Valentin Nikonorov, and Marina Yanenko. "Digital platforms based marketing innovations: new development trends." In SHS Web of Conferences, vol. 44, p. 00049. EDP Sciences, 2018.
- Cvitanović, Petra Leonora. "New technologies in marketing as competitive advantage." In 2018 ENTRENOVA Conference Proceedings. 2018.
- Arkhipova, Nadezhda, Alan Abaev, and Madina Gurieva. "Digital Technologies as a Factor in the Development of Modern Marketing." In 3rd International Conference on Economics, Management, Law and Education (EMLE 2017), pp. 30-33. Atlantis Press, 2017.
- Kumar, V., Divya Ramachandran, and Binay Kumar. "Influence of new-age technologies on marketing: A research agenda." Journal of Business Research 125 (2021): 864-877.
- Day, George S. "Organizing Marketing for an Era of Digital Turbulence." Handbook of Advances in Marketing in an Era of Disruptions: Essays in Honour of Jagdish N. Sheth (2018): 135.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

HERAKLION

School of Engineering

Department of Electrical and Computer Engineering - Undergraduate

Code		Title	ECTS Credits	Professor	Offered semester
2.004	2.004	Logic Design	6	KORNILIOS	S
3.004	3.004	Electronics I	6	KORNILIOS	W
4.002	4.002	Electronics II	6	KYMAKIS	S
4.003	4.003	Computer Organization	5	KORNAROS	S
5.002	5.002	Software Engineering	6	VIDAKIS	W
5.004	5.004	Algorithm Analysis and Design	6	FRAGOPOULOU	W
6.004	6.004	Digital Signal Processing	6	PAPADOURAKIS	S
7.003	7.003	Power Electronics	6	ORFANOUDAKIS	W
7.006	7.006	Modelling of Electronics and Electrical Systems	4	DRAKAKIS	W
	8.002	Electrical Machines II	4	ORFANOUDAKIS	S
8.005	8.005	Reliability Engineering	4	KATSIGIANNIS	S
8.006	8.006	Illuminance Technology	4	DRAKAKIS	S
9.005	9.005	Electrical Drive Systems	4	ORFANOUDAKIS	W
9.007	9.007	Materials and Devices for Storage and Energy Savings	4	VERNARDOU	W
9.008	9.008	Advanced Photovoltaic Devices	4	KYMAKIS	W
	7.022	Advanced Programming Techniques	4	VIDAKIS	W
	7.023	Computer Graphics and Virtual Reality	4	MALAMOS	W
	7.024	Knowledge Representation and Reasoning for the WWW	4	PAPADAKIS N	W
	7.025	Optical Communications	4	STRATAKIS	W
	7.026	Multimedia Technologies: Audio, Image, Video	4	PACHOULAKIS	W

7.027	Data and Information Visualization Systems	4	VIDAKIS	W
7.028	Internet Technologies	4	MALAMOS	W
7.029	Human Computer Interaction	4	AKOUMIANAKIS	W
8.019	Wireless Netwoks	4	STRATAKIS	S
8.021	Multimedia Communications	4	MALAMOS	S
8.023	Advanced Topics in DataBases	4	AKOUMIANAKIS	S
8.024	Television Systems	4	STRATAKIS	S
8.025	Games Design and Development	4	VIDAKIS	S
8.026	Web Applications Assesment	4	PAPADAKIS CH	S
8.027	Distributed Systems and Cloud Computing	4	PAPADAKIS CH	S
8.028	Parallel Processing	4	FRAGOPOULOU	S
9.016	Computer Networks II	4	PAPADAKIS CH	W
9.017	Big Data	4	PAPADAKIS N	W
9.020	Broadband and Next Generation Networks	4	STRATAKIS	W
9.021	Internet Multimedia and Computer Graphics	4	MALAMOS	W
9.022	Realistic Multimedia and Animation	4	PACHOULAKIS	W
9.023	Collaborative Technologies and Systems	4	MALAMOS	W
9.024	Agile Software Development	4	VIDAKIS	W
7.008	Pattern Recognition	4	PAPADOURAKIS	W
7.011	Design of Digital Circuits and Systems	4	KORNAROS	W
7.013	Biomedical Technology	4	TSIKNAKIS	W
7.014	New Technologies in Education	4	Kalogerakis	W
7.016	Advanced Technology Electronic Devices	4	KYMAKIS	W
8.009	Operating Systems	4	GRAMMATIKAKIS	S
8.010	Computer Architecture	4	KORNAROS	S

8.013	Biomedical Informatics	4	TSIKNAKIS	S
8.014	Useability Engineering	4	Kalogerakis	S
8.015	Neural Networks	4	PAPADOURAKIS	S
8.018	Project Evaluation and Management Systems	4	TSIKNAKIS	S
9.012	Embedded Systems	4	KORNAROS	W
9.014	Advanced Biomedical Engineering Topics	4	TSIKNAKIS	W
9.015	Computer Systems Security	4	GRAMMATIKAKIS	W

School of Engineering

Department of Informatics Engineering - Postgraduate (MSc)

Code		Title	ECTS Credits	Professor	Offered semester
		Computer Networks	7,5	Panagiotakis Spyros	W
		Advanced Multimedia Technologies	7,5	Malamos Athanasios	W
		Advanced Software Engineering	7,5	Vidakis Nikolaos	W
		Semantic Web	7,5	Papadakis Nikolaos	W
		Usability Engineering	7,5	kalogerakis Michalis	W
		Computational Intelligence	7,5	Papadourakis George	W
		Embedded Systems	7,5	Kornaros George	W
		Applied Mathematics	7,5	Karagiannakis Dimitrios	W
		Project Management and Research Methodologies	7,5	Tsiknakis Manolis	W
		Wireless Networks	7,5	Pallis Evangelos	S

		Advanced Topics in Antennas and Wireless Propagation and Measurements	7,5	Stratakis Dimitrios	S
		Distributed Systems and Applications	7,5	Fragopoulou Paraskevi	S
		Network Security	7,5	Evangelos Markakis	S
		Realisitic Multimedia and Animation	7,5	Pachoulakis Ioannis	S
		Advanced Topics in Artificial Intelligence	7,5	Marakakis Manolis	S
		Computer-Supported Collaboration	7,5	Akoumianakis Demosthenes	S
		Information and Communication Technologies (ICT) and Education	7,5	Vasilakis Kostas	S
		Advances on digital imaging and computer vision	7,5	Marias Konstantinos	S
		Multicore Architectures	7,5	Kornaros George	S
		Data Structures and Algorithms	7,5	Malamos Athanasios	S

DEPARTMENT OF MECHANICAL ENGINEERING

HERAKLION

Department of Mechanical Engineering

HERAKLION

MECHANICAL DESIGN I

Course Title	**Mechanical Design I**
ECTS	5
Tutor	Petousis Markos
Semester	Autumn semester
Objectives	"Mechanical Design I" aims in integrating basic mechanical engineering knowledge for the processing of technical problems related with the products design. Basic mechanical engineering knowledge, such as mechanical drawings, materials technology, mechanics, materials strength, machine elements and manufacturing technologies, are combined in an applied level for the design and development of a new or the redesign of an existing mechanical product. Understanding the industrial design stages (from the conceptual design, to the process of the idea and the evaluation of the prototype) is achieved from the students with the implementation of a mechanical design project through decision making processes.
Intended Learning Outcomes	The student who has successfully completed the Mechanical Design I class, will have the ability to: • Analyze a technical problem related to the design of a mechanical product • Seek ideas that lead to the solution of a technical problem • Select the optimum solution and covert it to a mechanical setup • Implement full design of the mechanical setup

	• Manufacture a prototype model for the mechanical setup Present the developed solution of the technical problem studied
Indicative Syllabus	1. The mechanical design process 2. Technical problems formulation and analysis 3. Collection and processing of information 4. Specifications list 5. Conceptual Design 6. Synthesis and evaluation of technical solutions 7. Development and design of a technical solution - Materials, parts, standardization - Loads, construction analysis - Kinematics, mechanisms - Safety - Manufacturing and production - Assembly - Maintenance, reliability - Aesthetics, ergonomics - Billing - Innovation - Design optimization 8. Production systems and processes selection 9. Organizing and administration of working groups 10. Mechanical design software tools in the computer
Teaching/Learning Methodology	**Lecture:** related to products design methodologies, NQM diagrams, 3d geometric modelling, finite elements analysis, market survey, standardized mechanical parts **Tutorial:** 3d geometric modelling, finite elements analysis
Assessment Methods in Alignment with Intended Learning Outcomes	Written Report 100% For the project implementation students employ advanced products design, analysis and prototype manufacturing methods, such as CAD/CAM/CAE software tools and 3d printers.

Students' Working Load	Lectures 60 hours Written Report 18 hours Oral Presentation 2 hours Homework 70 hours In total 150 hours → 5ECTS
Reading List and References	1. K. LEE. Principles of CAD/CAM/CAE Systems, 1999. 2. I. ZEID. CAD/CAM theory and practice. McGraw Hill, New York, 1991. 3. S. Rao, The Finite Element Method in Engineering 6th Edition, Butterworth-Heinemann, 9780128117682, October 2017 4. Saad A. Ragab, Hassan E. Fayed Introduction to Finite Element Analysis for Engineers CRC Press ISBN 9781138030176 2018

HEAT TRANSFER II

Course Title	**Heat Transfer II**
ECTS	5
Tutor	Tzirakis Costas
Semester	Autumn semester
Objectives	The course presents a detailed description of conduction, convection and radiation. It is mainly focused on 1-D and 2-D steady state and transient systems. A significant part of the course is dedicated to radiation (properties and radiation exchange between surfaces), view factors and thermal resistance circuits. Heat exchangers and basic storage units theory is also covered as a means for studying and finally selecting appropriate heat exchangers.
Intended Learning	Upon completion of the subject, students will be able to:

Outcomes	a) understand the basic concepts of conduction, convection and radiation. b) perform combined studies of all heat transfer modes in various environments (houses, factories, etc.). c) calculate heat loss from fins of uniform and non-uniform cross section. d) understand the basic concepts of thermal boundary layer and solve complicated thermal resistance circuits (Kirchhoff's law, view factors, black body radiation etc.). e) study the finally select the appropriate heat exchanger that suits specific and well-defined requirements.
Indicative Syllabus	1. Introduction (4 hours) o Introduction to conduction, convection, and radiation 2. 1-D heat transfer (8 hours) o Mathematical formulation of 1-D heat transfer o Example problems on various geometries 3. 2-D heat transfer (8 hours) o Mathematical formulation of 2-D heat transfer o Example problems on various geometries 4. Radiative hear transfer and view factors (8 hours) o Introduction to electromagnetic waves, Planck's radiation law and black body radiation o Integral calculus and view factor computation of specific geometric configurations 5. Thermal resistance circuit (4 hours) o Kirchhoff's current law for heat transfer o Series and parallel thermal networks 6. Example problems on radiative heat transfer (8 hours) 7. Heat exchangers (8 hours) o Understanding heat exchangers, basic principles and design characteristics o Example problems on heat exchangers
Teaching/Learning Methodology	**Lecture:** the lectures are performed using PowerPoint presentations, lecture notes and textbooks on heat transfer. **Tutorial:** some of the lectures are specifically designed as tutorial classes where example problems will be presented and group discussions will assist the students in understanding the appropriate material.
Assessment Methods in Alignment with	Mid-term exam: 30% Final exam: 70%

Intended Learning Outcomes	
Students' Working Load	Lectures 48 hours Self-study 42 hours Homework 60 hours In total 150 hours → 5 ECTS
Reading List and References	1. Heat Transfer: Pitts and Sissom, Schaum's outlines 2. Introduction to Engineering Heat Transfer: Nellis and Klein, Cambridge University Press 3. Fundamentals of Heat and Mass Transfer: Incropera, DeWitt, Bergman and Lavine

MACHINE DYNAMICS AND VIBRATIONS

Course Title	Machine Dynamics and Vibrations
ECTS	5
Tutor	Papadakis Nicos
Semester	Autumn semester
Objectives	The analysis of motion, velocity, acceleration, and forces in mechanisms and machines. Emphasis is placed on the modelling of the physical system and the derivation of the equation of motion. Additionally analytical methods suitable for hand calculation, computerized analysis and preliminary design studies. The course starts with the simpler Single DOF systems, and gradually set the foundation to Multiple DOF systems and modal analysis. Special emphasis is placed on Vibration isolation and some common applications.
Intended Learning	The course Machine Dynamics and Vibrations aims that the student upon successful completion is able to:

Outcomes	f) recognize standard mechanical dynamical systems and their order g) identifies the basic dynamic characteristics that affect the dynamics of mechanical systems h) qualitatively evaluates the dynamic and oscillating behavior of mechanical systems with linear characteristics. i) To calculate the dynamic and oscillating behavior of mechanical systems. j) Develop models for standard mechanical dynamical systems with appropriate simplifications/assumptions k) evaluate dynamic systems, l) apply methodologies in the design of mechanical oscillation isolation devices.
Indicative Syllabus	Review kinematics and kinetics of particles. Single degree of freedom systems • Vibration for mass-spring system, natural frequency. • Rotational vibration (Systems involving pendulums). • Finding the stiffness of complicated systems and real life components. • Equation of motions for complicated vibratory systems. • Damping in 1-DOF systems. • Forced vibration (Applied force and also unbalanced rotation), and resonance. • Forced vibration (Base Excitation) • Transient response (convolution integral) • Solution approaches (numerical, laplace, transfer functions) Two degree and multiple degree of freedom systems • Introduction with the 2dof system • Eigenvalues and Natural frequencies • Modal analysis • Free vibrations of MDOF systems • MDOF Systems with Viscous Daming • Forced vibrations of MDOF • Intro Vibration of Continuous System. Design for Vibration suspension • Acceptable levels of vibration • Vibration isolation

	• Vibration absorbers • Daming in Vibration Absorption • Critical Speeds of rotating disks (Jeffcott motor, Rayleigh approach
Teaching/Learning Methodology	**Lecture:** the fundamentals of *Machine Dynamics and Vibration* will be described using ppt presentations, demonstrating videos, Internet. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. **Tutorial:** a set of problems and group discussion topics will be arranged in the tutorial classes. Students are encouraged to solve problems before having solutions.
Assessment Methods in Alignment with Intended Learning Outcomes	Bi weekly tests : 30% Reports : 20% Written Report : 50% Continuous assessment consists of bi-weekly small tests, reports. The continuous assessment will assess the students' understanding of basic concepts and principles in the lecture content.
Students' Working Load	Lectures 39 hrs Tutorials 26 hrs Homework 30 hrs Self study 55 hrs In total 150 hours → 5ECTS
Reading List and References	1. Gans Mechanical Systems A Unified Approach to Vibrations and Controls, Springer Verlag 2. S.Kelly Mechanical Vibrations: Theory and Applications, Cengage Learning 3. S.S.Rao, "Mechanical Vibrations", Pearson; 5th edition (September 17, 2010) 4. D.Inman "Engineering Vibrations", Pearson; 4th edition (March, 2013)

Mechanical Drawing II

Course Description

Course Title	Mechanical Drawing II
ECTS	5
Prerequisite/ Corequisite	--
Semester	Spring semester
Objectives	The **Mechanical Drawing II - CAD** aims to utilize and deepen the existing basic knowledge, standardizations and regulations, acquired in the Mechanical Drawing I and their applications in integrated Mechanical Drawings. The students will be invited to realize drawings of assemblies of mechanical devices.
Intended Learning Outcomes	The aim of the course of the **Mechanical Drawing II - CAD** is to offer to the students the opportunity to apply the rules of the Mechanical Drawing and the standardization of machine elements and parts, in order to acquire the ability and the skills: • to know in depth the international regulations of standardization of the Mechanical Drawing, • to understand complex mechanical drawings and assemblies, as a composition of the individual parts, • to ttransform their thoughts, ideas and calculations into engineering drawings regardless of the degree of complexity • to make the desired or necessary corrections, upgrades and modifications of complex mechanical devices • to prepare complex mechanical drawings in appropriate design software. In Engineering Drawing II - CAD, the students are trained in depth, in 2D computer aided design using the AutoCAD platform.
Indicative Syllabus	Preparation of 13 engineering drawings and assemblies for the implementation of all the following modules: 61. Tolerances in the mechanical drawing. 62. Welding and design of welded structures. 63. Drawings of machine elements and parts of any kind. 64. Search and use templates and machine component catalogs. 65. Views, sections and half sections of assemblies. 66. Drawings of mechanical assemblies using normalized machine elements (threads, screws, shafts, bearings, gears, pulleys, springs, seals, piping, reducers, welds).
Teaching/Learning	**Tutorial:** Mechanical drawings of typical mechanical engineering assemblies.

Methodology	
Assessment Methods in Alignment with Intended Learning Outcomes	Weekly Drawings: 100%
Students' Working Load	Tutorials 40 hrs Homework 60 hrs Self study 50 hrs In total 150 hours → 5ECTS
Reading List and References	• Manual of Engineering Drawing: British and International Standards, Colin H. Simmons, Dennis E. Maguire, Neil Phelps. • Engineering Drawing, N S Parthasarathy, Vela Murali. • Learn AutoCAD!: Mechanical Drawing Using AutoCAD® 2017, David Martin. • AutoCAD 2007 Introduction to mechanical drawing and tutorial examples, BEN SHE.YI MING.

MECHANICAL DESIGN II

Course Title	MECHANICAL DESIGN II
ECTS	5
Tutor	Vairis Achilleas
Prerequisite/ Corequisite	-
Semester	Spring semester

Objectives	Mechanical Design II scopes in applying and expanding the basic engineering knowledge already acquired during previous semesters in order to: • advance his mechanical engineering education, a fundamental requirement for any professional engineer and • Overall management of a technical design problem of a mechanical part or device.
Intended Learning Outcomes	The appropriate combination of basic Engineering knowledge aims to the design of a new product or the redesigning an existing one. Understanding the stages of industrial design (from conception and elaboration of the idea, to the fabrication and evaluation of a prototype) is carried out as a group effort within a student design team.
Class Contents	1. The conceptual design processes. 2. Formulation and analysis of engineering problems. 3. Information Collection – Processing. 4. Specification list. 5. Composition - Review of technical solutions. 6. Development – Optimal Design of a technical solution. 7. Design organization and administration
Students' Working Load	Semestrial Project: Conceptual design of a machine or mechanism Project thesis and presentation

STATISTICS AND PROBABILITY

Course Title	**Statistics and probability**
ECTS	**5**
Tutor	Papadakis Nikos
Prerequisite/ Corequisite	-
Semester	**Spring semester**

Objectives	Introduction to probability and statistical inference. Topics include sample spaces, conditional probability and Bayes' rule, random variables, discrete and continuous probability distributions, expectation, estimation, and hypothesis testing. The course objective is to provide a foundation in probability theory and statistical inference to solve applied problems and to prepare for more advanced courses.
Intended Learning Outcomes	The course aims to impart to students theoretical knowledge and experience in practical application on probability theory, statistics and the basic concepts of stochastic analysis. Upon successful completion of the course the student will be able to: • Clearly explains concepts of statistics and probability • calculate quantities for probability distributions and random variables • Performs statistical calculations. • develop probabilistic and statistical models for certain applications, to compose approaches to problem solving in the science of engineering (in the strength of materials, production).
Indicative Syllabus	- The role of statistics in engineering - Probability - Discrete RVs and Probability distributions - Continuous RVs and Probability distributions - Joint Probability Distributions - Descriptive statistics - Point Estimation Parameters and Sampling Distributions - Statistical intervals of a single sample - Test of Hypotheses for a single sample - Statistical inference for two samples - Simple linear regression and correlation - ANOVA - Statistical Quality control
Teaching/Learning Methodology	**Lecture:** the fundamentals of *statistics and probability* will be described using ppt presentations, demonstrating videos, Internet. The students are free to request help.

	The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. **Tutorial:** a set of problems and group discussion topics will be arranged in the tutorial classes. Students are encouraged to solve problems before having solutions.
Reading List and References	▪ Douglas C. Montgomery and George C. Runge, "*Applied Statistics and Probability for Engineers"* ▪ Ronald Walpole "*Probability & Statistics for Engineers & Scientists*". ▪ Mendenhall W. & Sincich T., "Statistics for the Engineering and Computer Sciences", Collier Macmillan Inc., Canada, 1988.

MECHANICS II- APPLIED DYNAMICS

Course Title	**Mechanics II - Applied Dynamics**
ECTS	**5**
Tutor	Papadakis Nikos
Prerequisite/ Corequisite	-
Semester	**Spring semester**
Objectives	This course is an introduction to the dynamics and vibrations of lumped-parameter models of mechanical systems. Topics covered include kinematics, force-momentum formulation for systems of particles and rigid bodies in planar motion, work-energy concepts, virtual displacements and virtual work. Students will also become familiar with the following topics: Lagrange's equations for systems of particles and rigid bodies in planar motion, and linearization of equations of motion. The objective of the course is to provide basic knowledge of engineering dynamics to the students such that they can understand the basics of kinematics and kinetics for both particles and rigid bodies and their motion.
Intended Learning Outcomes	The aim of the course is to introduce the student to the basic principles of the dynamics of material point systems and rigid bodies.

	Upon successful completion of the course the student will be able to: - recognizes the basic of kinematic and dynamic concepts in engineering problems - Evaluates the effect of forces on the motion of bodies in relation to the center of gravity and the moment of inertia. - Calculates the rotational and translational motion of a body under the influence of forces. - Develop equations of motion - Application of vector engineering theorems for solving complex motion problem Evaluation of the change of the kinetic state through the principles of work-energy and Impulse-Momentum
Indicative Syllabus	Introduction Kinematics of Particles - Velocity and acceleration - Linear and Curvilinear motion - Coordinate Systems (Cartesian, Polar, Tangential-normal, spherical) Dynamics of Particles - Newton second law - Linear and angular momentum - Conservative systems - The principle of momentum conservation - Impulse, impulsive motion, and impact - Motion of center of gravity - Orbital mechanics Kinematics of Rigid Bodies - Planar motion of rigid bodies - General 3d motion - Mechanisms - Rotating Frames of Reference - Coriolis - Instantaneous centers Dynamics of Rigid Bodies - Equations of motion - Linear and Angular Momentum conservation

	- Work-Energy principle - Convervation of energy principle - Impulse momentum conservation Mechanical Vibrations - Equation of motion for the simple harmonic oscillator - Free vibrations, eigenfrequency - Damped free vibration, damping ratio - Forced Vibrations
Teaching/Learning Methodology	Lecture: the fundamentals of *applied dynamics* will be described using ppt presentations, demonstrating videos, Internet. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. Tutorial: a set of problems and group discussion topics will be arranged in the tutorial classes. Students are encouraged to solve problems before having solutions.
Reading List and References	▪ Ferdinard P.Beer and E.Russell Johnston,Jr., Vector Mechanics for Engineers: Statistics and Dynamics, Fifth Edition, McGraw-Hill, 1988. ▪ R.C. Hibbeler, Engineering Mechanics: Statistics and Dynamics, Sixth Edition, MacMillan Publishing Company, USA 1992

PROGRAMMING FOR ENGINEERS

Course Title	**Programming for Engineers**
ECTS	**4**
Tutor	Kozyrakis Giorgos
Prerequisite/ Corequisite	-
Semester	**Spring semester**
Objectives	The course is a continuation of the introductory course in computer programming and aims to expand - complement the knowledge of students in programming and to deepen the knowledge and understanding of programming language and structured programming in general, by applying them to solving problems found in Mechanical Engineering projects. LEARNING RESULTS Upon successful completion of the course the student will be able to: • Solves computational problems in a modern programming environments. • Will acquire the experience for executing practical applications. • Will have acquire a solid foundation for specific projects that require advanced computer programming. • Will have immersed himself in object-oriented programming methods for designing programs, libraries and auxiliary programming tools.
Intended Learning Outcomes	The course is one of the basic courses of Mechanical Engineering, with which the student has the opportunity to be trained in concepts and methods of advanced programming with application in problem solving in Engineering. While attending the course, the student will be taught in the following subjects: • Algorithms and Algorithmic Programming. • Use and Create Classes and Objects. • Permanent storage and retrieval of data. • Create complex graphic objects. • Accuracy and errors of numerical methods. • Numerical solution of linear and non-linear functions.

	• Methods of statistical processing of time series of Environmental and Mechanical applications and advanced statistical data analysis
Indicative Syllabus	-
Teaching/Learning Methodology	-
Reading List and References	-

INDUSTRIAL SYSTEMS AND MAINTENANCE

Course Description

Course Title	Industrial Systems and Maintenance
ECTS	5
Prerequisite/ Corequisite	--
Semester	Spring semester
Objectives	This course is the main course in the field of engineering, as the students which are already familiar with the concepts that govern the requirements, design, specifications, standards, dimensioning, application, operation of basic infrastructure and facilities in the modern industrial environment, will now address the issue of maintenance. The familiar to the student classical concepts of electromechanical installations and networks in general, will be further specialized in their industrial scale and in their adaptation to the respective production needs of industrial units. Furthermore, special industrial facilities are presented along with their requirements and specifications, which the student is not taught in the context of other courses.

	Finally, the student is taught in particular topics related to the operation of these facilities, their availability needs and their methodology of preventive and invasive maintenance, as well as the extension of these concepts to other production equipment
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) To understand, recognize and comprehend the different needs and the scale of facilities and networks in industry. b) To know the principles of design and calculation of the facilities and the relevant equipment available. c) To know the principles of preventive and invasive maintenance of networks, facilities and equipment and how to apply them in industrial environments.
Indicative Syllabus	**Section A: Industrial Facilities** ▪ Introduction to industrial facilities, their categorization and specifications ▪ Characterization of facilities and productive operating environment ▪ Determination of the functional requirements of the industrial environment ▪ Installations and networks of industrial water supply and sewage ▪ Industrial networks and fire detection and extinguishing systems ▪ Installations and systems of heating, cooling, air conditioning, ventilation and dusting in industry ▪ Industrial electrical networks, medium and low voltage, substations, traffic and lighting networks, low current networks and wireless connections. Industrial-scale uninterruptible power supply systems and systems. ▪ Industrial networks for the supply of compressed air and pneumatic power. ▪ Material transport systems. Conveyor belts, lifting devices, pneumatic conveying systems, spatial planning. ▪ Basic environmental management and environmental protection systems against industrial pollution **Section B: Operation and Maintenance of Industrial Facilities and Maintenance** ▪ Supervision and monitoring of the operation of industrial facilities. ▪ The needs and principles of maintenance of machines and facilities. ▪ Mechanical maintenance policies, spare parts management and fault management techniques
Teaching/Learning Methodology	**Lecture:** The fundamentals of Industrial Systems Maintenance theories will be presented and their various applications will be described using ppt presentations. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance.
Assessment Methods	Exams: 40% Written Report (homework)

in Alignment with Intended Learning Outcomes	and Oral Presentation 60%
Students' Working Load	Lectures 65 hours Written Report (homework) and Oral Presentation 85 hours In total 150 hours → 5ECTS
Reading List and References	• Lindley R. Higginsm: Maintenance engineering handbook, New York: McGrawHill, 1988. • Industrial maintenance reference guide / Robert C. Rosaler, Tyler G. Hicks, project editor, New York : McGraw-Hill, c1987. • Maintenance engineering : organization and management / Frank Gradon, London : Applied Science Publishers, c1973.

SOLAR RADIATION AND APPLICATIONS

Course Description

Course Title	**Solar Radiation and Applications**
ECTS	5
Prerequisite/ Corequisite	--
Semester	Spring semester
Objectives	This course aims to provide understanding of basic and advanced issues related to solar systems, including electromagnetic radiation from the sun, solar geometry, as well as design and dimensioning of photovoltaic systems and solar thermal systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: d) Study and assess of the solar potential of a specific place e) Analyze the basic characteristics of photovoltaic and solar thermal systems f) Characterize the long-term performance of solar thermal systems g) Dimension an autonomous or interconnected photovoltaic system h) Use software tools to estimate the energy production from photovoltaic and solar thermal systems.
Indicative Syllabus	1.Solar radiation basics (1 hour) ○ Basic principles ○ Diffuse and direct solar radiation ○ Measurement 2. Solar geometry (4 hours) ○ Basic angles ○ Solar and civil time ○ Sun paths ○ Estimation of extraterrestrial solar radiation and available solar radiation on Earth's surface 3. Solar thermal systems (5 hours) ○ Operation principle and basic parameters

	○ Flat plate and evacuated tube collectors ○ f-chart method 4. Photovoltaic (PV) systems (6 hours) ○ Physics of a PV cell ○ Types of PV modules ○ Types and components of PV systems ○ Dimensioning of PV systems ○ Other issues related to PV systems (maintenance, etc)
Teaching/Learning Methodology	**Lecture:** Various applications of displays will be described using ppt presentations, demonstrating videos, and internet sites. The students are free to request help. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. **Exercises:** A set of problems about the main topics of the course will be arranged in the tutorial classes. The needed written exercises will differ on their initial data for each student.
Assessment Methods in Alignment with Intended Learning Outcomes	Written exercises: 20% Written Report: 60% Oral Presentation: 20% The basic assessment method will be a written project related to a specific topic in solar systems. The evaluation of this project will be based by the quality of the written report, the oral presentation, as well as the feedback with the students during the whole semester. Apart from this, students will also be evaluated by a number of written exercises that will cover the main sections of the course (solar geometry, solar thermal systems and photovoltaic systems).60%
Students' Working Load	Lectures 16 hours Written Report 80 hours Oral Presentation 2 hours Homework – Exercises 52 hours In total 150 hours → 5ECTS
Reading List and References	• Duffie, John A., and William A. Beckman. Solar engineering of thermal processes, 4th edition. John Wiley & Sons, 2013. • Mertens, Konrad. Photovoltaics: fundamentals, technology and practice. 2013.

	• Häberlin, Heinrich. Photovoltaics: system design and practice. John Wiley & Sons, 2012. • Lynn, Paul A. Electricity from sunlight: an introduction to photovoltaics. John Wiley & Sons, 2011.

Final project Thesis (ECTS: 20)

Depends on the subject and the Professor.

Areas of subject: Thermal Transfer, Dynamics, Vibrations, Advanced Manufacturing, Robotics, Wind Energy

DEPARTMENT OF MUSIC TECHNOLOGY & ACOUSTICS

School of Music & Optoacoustic Technologies

Department of Music Technology & Acoustics

School of Music & Optoacoustic Technologies

RETHYMNO

https://mta.hmu.gr/

Description of (B.Sc) courses offered in English

WINTER SEMESTER									
Module Code	**X**	**Module Title**	**Number of teaching hours/week**				**ECTS**	**Semester**	**Responsbile**
			Θ	**A**	**E**	**Total**			
0807.3.004.1	Y	Programming Environments for Sound & Music	2	2		4	7	3rd	S. Paschalidou
0807.5.003.1	Y	Sound Design	2	2		4	6	5th	K. Tzedaki
0807.5.006.1	E Y	Audio Software Development	2	2		4	7	5th	M. Kaliakatsos

WINTER SEMESTER									
Module Code	**X**	**Module Title**	**Number of teaching hours/week**				**ECTS**	**Semester**	**Responsbile**
			Θ	**A**	**E**	**Total**			
0807.7.012.1	EY	Acoustic Ecology and Sound Arts	2	2		4	6	7th	K. Tzedaki
Total Winter Semester courses offered in English (Y & EY)			**8**	**8**		**16**	**26**		

SPRING SEMESTER									
Module Code	**X**	**Module Title**	**Number of teaching hours/week**				**ECTS**	**Semester**	**Responsbile**
			Θ	**A**	**E**	**Total**			
0807.2.004.1	Y	Structured Programming	2	2		4	7	2nd	C. Alexandraki
0807.6.007.1	EY	Electronic Musical Instruments	2	2		4	6	6th	K. Tzedaki
0807.8.002.1	EY	Selected Topics in Acoustics	2	2		4	6	8th	S. Kouzoupis
0807.8.004.1	EY	Applied Machine Learning	2	2		4	6	8th	M. Kaliakatsos
Total Spring Semester courses offered in English (Y & EY)			**8**	**8**		**16**	**25**		

Abbreviations:

Θ: Theory, Α: Practical sessions, Ε: Lab.

Course type (Χ): Υ: Compulsory, ΕΥ: Compulsory with options, Π: Elective

COURSE TITLE	*Programming Environments for Sound & Music*		
COURSE CODE	0807.3.004.1	**SEMESTER**	3rd / Winter
COURSE PROMOTER	Dr. Stella Paschalidou		
TEACHING ACTIVITIES		**HOURS PER WEEK**	**ECTS**
LECTURES		2	
PRACTICAL SESSIONS		2	
TOTAL		4	7
TYPE OF COURSE	Compulsory		
PREREQUISITE COURSES	No		
TEACHING LANGUAGE	Greek/English		
OFFERED TO ERASMUS STUDENTS	Yes		
AIMS & OBJECTIVES			

The course aims at getting students acquainted with audio programming environments and providing them with the basic understanding and skills of audio programming. This can be considered as an introductory course in digital audio synthesis, as it covers rudimentary knowledge on digital sound and computer music. No prior computer programming skills are required.

More specifically, the course offers fundamental knowledge on the following subjects:

- computer music

- digital sound

- digital sound synthesis

- GUIs and audio interactive systems.

LEARNING OUTCOMES

By completion of this course, students will be familiar with the theoretical background required for understanding basic sonic algorithmic processes and will have gained skills to develop their first computer music synthesis and sonic interaction algorithms in (mainly, but not exclusively) graphical audio programming environments.

COURSE CONTENT

- Introduction to audio programming environments and languages (graphical/modular versus textual)
- Bridging analog to digital sound
- Digital sound: sampling & quantization
- The concepts of Oscillators, Unit Generators, Wavetables and Signal flowcharts
- Interpolation functions over time for sound control (amplitude envelopes, glissandi)
- Stereo imaging and panning
- Additive synthesis (example: Bell by Jean-Claude Risset)
- LFOs for tremolo and vibrato
- Real-time sound control and interaction (mouse and MIDI controllers)
- Overview and comparison of audio programming environments

Indicative audio programming environments used during practical sessions: MaxMsp / PureData, Supercollider.

RECOMMENDED LITERATURE

[1] Online course material and hand-outs ('E-class' online platform)
[2] Διαμαντόπουλος Τ., Η μουσική των υπολογιστών
[3] Λώτης Θ., Διαμαντόπουλος Τ., Μουσική πληροφορική και μουσική με υπολογιστές
[4] Roads C., The Computer Music Tutorial
[5] Dodge C., Jerse T., Computer Music: Synthesis, Composition, and Performance
[6] Collins N. & d'Escrivan J., The Cambridge Companion to Electronic Music
[7] Wilson S., Cottle D, Collins N., The Supercollider book

COURSE TITLE	*Sound Design*		
COURSE CODE	0807.5.003.1	**SEMESTER**	5th / Winter
COURSE PROMOTER	Dr. Katerina Tzedaki		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	
TOTAL	4	6

TYPE OF COURSE	Compulsory
PREREQUISITE COURSES	0807.2.005.1 [Morphology of Sound]
TEACHING LANGUAGE	Greek/English
OFFERED TO ERASMUS STUDENTS	Yes

AIMS & OBJECTIVES

The aim of the course is to introduce the theoretical and practical issues of sound design.

COURSE CONTENT

The thematic modules of the course include:

Basic concepts and terminology in the sound arts.

Sound arts and the music of sounds.

Areas of application of sound design.

Methodologies for collecting, classifying and categorizing audio material.

Basic techniques of transforming sounds with mechanical, analogue and digital means.

Listening and analysis of selected musical and audio-visual artistic works.

Functional categories of sound and music in their coexistence with moving image

Final Assignment: Independent individual work of creating an original sound composition or sound overlay.

COURSE TITLE	*Audio Software Development*		
COURSE CODE	0807.5.006.1	**SEMESTER**	5th / Winter
COURSE PROMOTER	Dr. Maximos Kaliakatsos		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	

	TOTAL	4	7
TYPE OF COURSE	Compulsory with options		
PREREQUISITE COURSES	No		
TEACHING LANGUAGE	Greek/English		
OFFERED TO ERASMUS STUDENTS	Yes		

AIMS & OBJECTIVES

Developing software that processes audio, especially in real-time, presents challenges that are related to advanced subjects in digital signal processing, computer science, software engineering and mathematics. This course presents the principles that are necessary for audio software development within each of these subjects. Even though it is assumed that the student already has some basic understanding of the basics the aforementioned disciplines, the course starts from the fundamentals and takes the shortest route toward developing close to product-level synthesisers and audio effects, in the form of standalone applications (Mac, Windows, Linux), smart devices (iOS, Android) and VST-plugins. The course starts with python but transits to C++ using JUCE, a framework that facilitates rapid product-level development.

Aim of this course is to provide the necessary components of digital signal processing and mathematics as well as the computational background in computer science and software engineering to enable students to develop software that processes audio, mainly in real time.

LEARNING OUTCOMES

On completion of this course, students will be able to:
- Understand the basic workflow and fundamental difficulties of real-time audio processing software development.
- Identify and debug common theoretical (e.g. aliasing) and technical (e.g. buffer overflow) issues that arise when developing audio software applications.
- Develop basic software that implements basic effects and sound visualisations.
- Export the software they develop for computer devices (Mac, Windows, Linux and VST-plugins) and smart devices (iOS and Android).
- Use git to store, distribute and showcase their work.

COURSE CONTENT
The course starts with fundamental issues on digital signal processing in python, along with an introduction of some python libraries that facilitate and enable real-time audio processing. From the beginning, all code is provided through GitHub and, therefore, the philosophy and basic manipulation of GitHub is discussed. After an introduction to real-time audio processing in Python, object oriented programming is introduced, which leads to an introduction in C++. The JUCE framework is presented and simple software is developed for synthesisers and sound effects.
RECOMMENDED LITERATURE
[1] Géron, A. (2022). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow. " O'Reilly Media, Inc.". [2] Foster, D. (2022). Generative deep learning. " O'Reilly Media, Inc.".

COURSE TITLE	*Acoustic Ecology and Sound Arts*		
COURSE CODE	0807.7.012.1	**SEMESTER**	7th / Winter
COURSE PROMOTER	Dr. Katerina Tzedaki		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	

	TOTAL	4	6
TYPE OF COURSE	Compulsory with options		
PREREQUISITE COURSES	No		
TEACHING LANGUAGE	Greek/English		
OFFERED TO ERASMUS STUDENTS	Yes		
AIMS & OBJECTIVES			
This course aims to introduce students to the issues and practices of Acoustic Ecology and their application to Sound Arts.			
LEARNING OUTCOMES			
Upon successful completion of the course, the student will be able to: To understand and use the terminology of Acoustic Ecology (AE). To apply research methodologies of AE (sound maps, categorization of sound sources and events, soundwalking, field recordings) to the study and analysis of any sound environment. To create sound environments and/or soundscape compositions			
COURSE CONTENT			

What is Acoustic Ecology? – Basic Terminology. - Related areas and terminology.

Historical Isuues and Current Trends of Acoustic Ecology. -

Sound Arts – An intoduction - Terminology

Soundscape Research – Field work- Practices- Soundscape Analysis

Soundwalking and Soundscape composition.

Acoustic Ecology and Sound Arts- Issues and Applications.

Assignments:

Soundscape Recording, Reasearch and Analysis (40%)

Soundscape Composition (40%)

Field work (participation) (20%)

COURSE TITLE	*Structured Programming*		
COURSE CODE	0807.2.004.1	**SEMESTER**	2nd / Spring
COURSE PROMOTER	Dr. Chrisoula Alexandraki		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	
TOTAL	4	7

TYPE OF COURSE	Compulsory
PREREQUISITE COURSES	No
TEACHING LANGUAGE	Greek/English
OFFERED TO ERASMUS STUDENTS	Yes

AIMS & OBJECTIVES

This course focuses on algorithmic problem solving and algorithm implementation, thus aiming at the development of general reasoning and problem solving skills to fluently interpret and design structured procedures and rule systems.

LEARNING OUTCOMES

Specific objectives of the course focus on developing skills for:

a) Algorithmic thinking, i.e. how to analyse the solution to a given problem in a finite number of well-defined steps.
b) Algorithm implementation, i.e. how to transform an algorithm to a computer program and what are the best practices in coding, documentation and effective use of computer memory and processing power.
c) C Programming Language, i.e. acquaint students with one of the most fundamental programming languages. The course emphasizes on different concepts including variables, numerical operations, control structures, procedures, pointers, data structures and memory management.

COURSE CONTENT

Following are the titles of weekly lectures:

1. Introduction: Algorithms and Programs
2. Variable types, operands, program input/output
3. Flow Control Structures: sequence, selection, repetition
4. Arrays
5. Pointers, pointer operations, array-pointer relationship
6. Functions, call-by-reference, call-by-value, variable scope
7. Strings and string operations
8. Dynamic Memory Allocation
9. Data Structures
10. File operations

RECOMMENDED LITERATURE

[1] Programming in C. C, Kernighan B., Ritchie D., Pearson; 2nd edition, 1988.

[2] Programming in ANSI C. E. Balagurusamy, MC GRAW HILL INDIA; 8th edition, 2019.

COURSE TITLE	*Electronic Musical Instruments*		
COURSE CODE	0807.6.007.1	**SEMESTER**	6th / Spring
COURSE PROMOTER	Dr. Katerina Tzedaki		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	
TOTAL	4	6

TYPE OF COURSE	Compulsory with options
PREREQUISITE COURSES	0807.3.004.1 [Programming Environments for Sound & Music]
TEACHING LANGUAGE	Greek/English
OFFERED TO ERASMUS STUDENTS	Yes

AIMS & OBJECTIVES

The course aims to familiarize students with topics related to the structure, function, design and practice of new musical instruments.

LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to: To analyse the structure, functions and practice of a musical instrument. To experiment with ideas on the design of new musical instruments. The thematic modules of the course include: Electronic Musical Instruments: Types, Operation, History. Musical instruments as interactive systems. Similarities and Differences of acoustic and electronic musical instruments. Anatomy of a musical instrument. Generalised Model. Typology of New Musical Instruments.. Sound design issues Design and Evaluation Issues. Current and Future Trends in Research and Design.
COURSE CONTENT
An introduction to the history, design, operation and functions of electronic, digital, experimental, hybrid and interactive musical instruments.

COURSE TITLE	*Selected Topics in Acoustics*		
COURSE CODE	0807.8.002.1	**SEMESTER**	8th / Spring
COURSE PROMOTER	Dr. Spyros Kouzoupis		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	
TOTAL	4	6

TYPE OF COURSE	Elective
PREREQUISITE COURSES	0807.4.001.1, 0807.4.002.1 [Digital Signal Processing, Room Acoustics]
TEACHING LANGUAGE	Greek/English
OFFERED TO ERASMUS STUDENTS	Yes

AIMS & OBJECTIVES

Acquiring a good understanding of a certain acoustics branch. Typical acoustics areas could be: Musical acoustics, structural acoustics, room acoustics, bioacoustics, numerical acoustics e.t.c.

LEARNING OUTCOMES

Basic theoretical knowledge and experimental or numerical skills concerning a certain Acoustics topic.

COURSE CONTENT

This is a project oriented course. Students will pick a topic from a list of topics and write up a report, introducing the selected field, perform basic bibliographical survey and depending on the subject selected, engage in some simple experimental or numerical work.
RECOMMENDED LITERATURE
Depends on the topic selected.

COURSE TITLE	*Applied Machine Learning*		
COURSE CODE	0807.8.004.1	**SEMESTER**	8th / Spring
COURSE PROMOTER	Dr. Maximos Kaliakatsos		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**ECTS**
LECTURES	2	
PRACTICAL SESSIONS	2	
TOTAL	4	6

TYPE OF COURSE	Compulsory with options
PREREQUISITE COURSES	0807.4.001.1 0807.5.006.1 [Digital Signal Processing, Audio Software Development]

TEACHING LANGUAGE	Greek/English
OFFERED TO ERASMUS STUDENTS	Yes

AIMS & OBJECTIVES

Machine learning has become a fundamental part of many research and commercial applications. Modern frameworks like Keras/Tensorflow and Scikit-learn have made it easy to write programs that implement sophisticated machine learning algorithms that can be readily applied to text, image and audio data. This course offers an introduction to the fundamentals of machine learning and quickly scales to applications that include data from image and text to audio and music. The student is expected to obtain a clear understanding of the basic mathematical principles and working knowledge on developing end-to-end research implementations, i.e., from data curation to proper presentation of results. All programming is in Python using the Keras framework, while the course offers material from books, slides and GitHub code.
Aim of this course is to provide a clear understanding of the basic principles that underly modern machine learning algorithms, while enabling end-to-end implementation of basic versions of modern machine learning systems.

LEARNING OUTCOMES

On completion of this course, students will be able to:
- Identify the correct class of algorithms for solving specific problems.
- Prepare data in optimal representations for specific tasks.
- Follow steps to mitigate common obstacles concerning overfit and error stagnation.
- Present results in a scientifically rigorous manner.

COURSE CONTENT

The course starts with basic ideas around data dimensionality, dimensionality reduction and linear regression. This study leads to a straightforward understanding of artificial neural networks (ANNs). The MNIST digits dataset is employed for introducing basic supervised learning with feedforward ANNs and towards the introduction of convolutional layers. 1D convolutional layers are introduced for waveforms and 2D for spectrograms. Autoencoders are then implemented which lead to Variational Autoencoders and Generative Adversarial Networks, initially with the MNIST dataset and then for audio. Recurrent Neural Networks (LSTM and GRU) are also examined for sequence learning and sequence-to-sequence translation, along with Temporal Convolutional Networks (TCNs). This study leads to Transformer encoder-decoder architectures (under the hood of ChatGPT), which are understood deeply and developed with ready-made implementations of KerasNLP.

RECOMMENDED LITERATURE

[1] Géron, A. (2022). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow. " O'Reilly Media, Inc.".
[2] Foster, D. (2022). Generative deep learning. " O'Reilly Media, Inc.".

DEPARTMENT OF NURSING

HERAKLION

DEPARTMENT OF NUSRING

HERAKLION

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nursing		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE		SEMESTER	8th
COURSE TITLE	NURSING PRACTICE IN HOSPITAL (INTERNSHIP)		
TEACHING ACTIVITIES	HOURS PER WEEK	CREDITS	
(weekly work in hospitals, or community health settings).	40	5	
TYPE OF COURSE	Obligatory / Nursing		
PREREQUISITE COURSE	1. Medical Nursing I - II 2. Surgical Nursing I - II 3. ICU Nursing 4. Emergency Nursing		
TEACHING LANGUAGE	Greek		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)			

LEARNING OUTCOMES
Practical Training: the main object is to consolidate and expand the knowledge and skills acquired during Practical Nursing Internship, so that they can realize the professional nursing role without special guidance from the supervisor. Upon successful completion of the course, students will be able to:

• Consciously associate the theoretical approaches of Nursing with clinical implementation, having the capacity of an integrated clinical environment.
• Have developed professional role awareness through responsibility, initiative development, development of interdisciplinary cooperation, respecting the principles and values of Nursing Science.
• Use the knowledge and skills acquired during the training as well as the opportunities offered by the Organization to help, prevent, ant treat patients, families, groups and communities
• Understand the role of the Nurses for investigating - identifying patients' needs, designing and submitting proposals for implementing nursing care plans.
• Promote dynamics of self-help and activation of the population in order to meet needs in community settings.
• Contribute to the development of the interconnection of Health Services in order to better meet the needs of the elderly and the community.

General abilities

- General Capabilities
- Decision making
- Autonomous Work
- Teamwork
- Working in an interdisciplinary environment
- Design and Management of Projects, Interventions
- Respect for diversity and multiculturalism
- Exercise of critical thinking

CONTENT OF THE COURSE

The practical lesson " NURSING PRACTICE IN HOSPITAL (INTERNSHIP) consists of:

1. The course will be conducted in two hospitals located at Heraklion City (PAGNI & VENIZELIO). Also some months can be delivered in Primary Health Care Facilities in the Municipality of Heraklion.
2. The course aims to familiarize students with the implementation of nursing work in the framework of the operation of Nursing Organizations, to acquire a professional identity, to empower them so that they can function as nurses, achieving autonomy from the supervisor. Trainees make use of the knowledge and skills they have acquired during the training, as well as the opportunities offered by the Organization to identify, prevent, treat and address modern problems of individuals, families, groups and communities.

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Participation in the daily nursing program in hospitals or primary care setting.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	• Support Learning Process via the e-class platform • Communicating with students via email
WAYS OF TEACHING	Activities | Workload of semester

	Practical Exercise	150
	Writing reports	30
	Total	***180***
STUDENTS' EVALUATION	The presence of the student is necessary in both parts (Practice in the Organization and weekly group supervision) Required attendance rate of 80%, while the final grade of the course is evaluated both. Required is the fulfillment of specific educational criteria, according to the expected learning outcomes. Educational evaluation criteria are accessible to students in the e-class During the semester; the group supervises an intermediate assessment (including self-assessment of the student) as well as a final evaluation.	

RECOMMENDED LITERATURE

1. *Medical-Surgical Nursing, 10th Edition*
   by Donna D. Ignatavicius, MS, RN, CNE, CNEcl, ANEF, M. Linda Workman, PhD, RN, FAAN, Cherie R. Rebar, PhD, MBA, RN, COI and Nicole M. Heimgartner, DNP, RN, COI
2. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing (Brunner and Suddarth's Textbook of Medical-Surgical) 14th Edition*
3. *LeMone and Burke's Medical-Surgical Nursing: Clinical Reasoning in Patient Care 7th Edition*
   by Gerene Bauldoff, Paula Gubrud, Margaret Carno by Dr. Janice L Hinkle, Kerry H. Cheever
4. *A Textbook of Community Nursing, 2nd Edition*
   Edited by Sue Chilton, Heather Bain, Copyright Year 2018

DEPARTMENT OF NUTRITION AND DIETETICS

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NUTRITION AND METABOLISM II

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD211	Semester	4th
COURSE TITLE	NUTRITION AND METABOLISM II (MACRONUTRIENTS)		
TEACHING ACTIVITIES		HOURS PER WEEK	CREDITS
Lectures		4	6
TYPE OF COURSE	Mandatory		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/YD211/		
LEARNING OUTCOMES			
Nutrients that are needed in large amounts are called macronutrients. There are three classes of macronutrients: carbohydrates, lipids, and proteins. Macronutrients are carbon-based compounds that can be metabolically processed into cellular energy through changes in their chemical bonds. The chemical energy is converted into cellular energy known as ATP that is utilized by the body to perform work and conduct basic functions. The course focuses on the interconversion of macronutrients, the energy they offer and how a nutritionist-dietitian can utilize them in the diet (glycemic index, glycemic load etc.).			
General abilities			
• In the context of this course: • The trainee acquires knowledge in the individual metabolic pathways, which constitute the main possibilities of utilization of macronutrients, carbohydrates, lipids, proteins.			

• The trainee understands the logic that governs the metabolic processes of macronutrients (carbohydrates, lipids, and proteins), their interaction and their utilization in the phenomenon of life.
• Finally the learner learns to organize, analyze and explain experimental data related to the macronutrients and functional components of food.

CONTENT OF THE COURSE

- The study of the role of the three main nutrients of food in the human diet. The need for their participation in the diet and to highlight their interactions at the metabolic level, as well as the problems created by their deficient or unbalanced intake.
- Structure and characteristics of carbohydrates. Digestion and absorption of carbohydrates. Contribution of carbohydrates to the structure and function of the human body. Glycemic Index, Glycemic Load, Satiety Index, Insulin Index, Applications in Modern Dietetics.
- Structure and properties of proteins-amino acids. Digestion and absorption of proteins. Human requirements for amino acid proteins, biological value of proteins, ways of calculating them. Protein sources, bioavailability of amino acids. Disorders of insufficient or excessive intake of proteins-amino acids.
- -Structure and properties of fats found in food, digestion and absorption of fats. Human needs for fats, essential fatty acids. Effect of fat intake and type of fatty acids on health. Problems with fat metabolism. Disorders related to unbalanced intake and fat metabolism.
- Study of digestion, absorption, bioavailability and metabolism of proteins, vitamins, minerals and water, as well as their interactions. Interactions between nutrients and metabolic intermediates. Effect of nutrient metabolism on body function. Individual energy requirements and body composition.

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo - through internet during CONVID19 measures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. • Email, Skype (communication with students)
WAYS OF TEACHING	

Activities	*Workload of semester*
Lectures (2X12)	52
Experiential activities	0
Homework	20
Reading	48
Overall	**120**

STUDENTS' EVALUATION

1. Final exam test by critical written questions
2. Homework and class presentations of group projects
3. Group Discussions
4. Self-Assessments
5. Attendance and Participation
6. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.

RECOMMENDED LITERATURE
• Introduction to Nutrition and Metabolism 5th Edition, by David A. Bender, ISBN-13: 978-1466572249, ISBN-10: 1466572248 • Advanced Nutrition and Human Metabolism Sareen S. Gropper (Author) Jack L. Smith (Author), ISBN-13: 978-1133104056, ISBN-10: 1133104053 • Nutrition and Metabolism: An Integrated Approach, Evelyn Howard (Editor), ISBN-13: 978-1647400279. ISBN-10: 1647400279 • Understanding Nutrition and Metabolism, Elsa Holt (Editor), ISBN-13: 978-1641164207. ISBN-10: 1641164204 • Nutrition and Metabolism in Sports, Exercise and Health: Kang, Jie, 9781138687585

FOOD MICROBIOLOGY AND HYGIENE

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD237	Semester	4th
COURSE TITLE	FOOD MICROBIOLOGY AND HYGIENE		
TEACHING ACTIVITIES		HOURS PER WEEK	CREDITS
Lectures		4	5
TYPE OF COURSE	Mandatory		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/YD237/		

LEARNING OUTCOMES

The aim of the course is to teach students the sources of food contamination, the types of food hazards and how to deal with them in food establishments. The training of dietitians in matters of hygiene is a necessary condition for working in places where they directly or indirectly come into contact with food intended for eating. The course includes a laboratory with mandatory attendance for the final documentation of the training, according to the requirements of EFSA or relevant certification bodies for food safety.

General abilities

It is expected that upon completion of the course, students will be able to:

- Students acquire the basic knowledge of microbiology and food hygiene, focusing on the relationships of microorganisms with food and humans.
- Supervise the design and implementation of food safety and hygiene guidelines and food services.
- Correctly interpret the findings of recent scientific research on microbiology and food hygiene problems.
- Summarize and evaluate the literature on current research activity in food hygiene and microbiology

CONTENT OF THE COURSE

- The most important microorganisms in microbiology and food hygiene (fungi, yeasts, bacteria) -morphological, cultural, physiological and biochemical characteristics of them, reproduction, relationship with food and public health).
- Nutrition of microbes, their food types and effect of physicochemical factors on the growth and activities of microbes (temperature, pH, radiation, pressure).
- The growth of single-celled microorganisms and its parameters (number of divisions, generation time, growth rate, age of bacteria, curve and growth phases).
- Natural sources of food contamination (microflora of plants, animals, soil, water, air), food preservation principles (heat, cold, etc.).
- Microbiology, hygiene and control of water, milk, meat.
- Diseases transmitted through food contaminated with pathogenic microorganisms (foodborne infections and food poisoning - prevention measures).
- Protozoa important in microbiology and food hygiene.
- Metas important in microbiology and food hygiene.
- Viruses important in microbiology and food hygiene.

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo - through internet during CONVID19 measures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. • Email, Skype (communication with students)
WAYS OF TEACHING	

Activities	*Workload of semester*
Lectures (3X12)	48
Experiential activities	0
Homework	24
Reading	48
Overall	**120**

STUDENTS' EVALUATION	7. Final exam test by critical written questions 8. Homework and class presentations of group projects 9. Group Discussions 10. Self-Assessments 11. Attendance and Participation 12. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.

RECOMMENDED LITERATURE

- Food Microbiology and Hygiene 2nd ed. 1995 Edition, by Richard Hayes (Author), ISBN-13: 978-1461365747, ISBN-10: 1461365740
- Essential Microbiology and Hygiene for Food Professionals, By Sibel Roller, Copyright Year 2012, ISBN 9781444121490, Published April 27, 2012 by CRC Press
- Encyclopedia of Food Microbiology, 2nd Edition, Editors: Carl Batt Carl A. Batt. Editor in Chief: Richard Robinson, eBook ISBN: 9780123847331

- Essential Microbiology and Hygiene for Food Professionals, BySibel Roller, Edition1st Edition, Imprint CRC Press, DOIhttps://doi.org/10.1201/b13524, Pages240, eBook ISBN9780429102783
- Essential Microbiology and Hygiene for Food Professionals Paperback – 27 April 2012, by Sibel Roller (Author), ISBN-10 1444121499

CLINICAL NUTRITION II

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD31	Semester	6th
COURSE TITLE	CLINICAL NUTRITION II		

TEACHING ACTIVITIES	HOURS PER WEEK	CREDITS
Lectures	2	2
Tutorials	2	2
Practical Exercises	2	2
	6	6

TYPE OF COURSE	Mandatory
PREREQUISITE COURSE	No
TEACHING LANGUAGE	English
OFFERED TO ERASMUS STUDENTS	Yes
ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/YD31/

LEARNING OUTCOMES

The aim of the course is to provide an in depth understanding of the principles and the use of Medical Nutrition Therapy (MNT) (or Clinical nutrition) within the context of secondary and tertiary health prevention. The students gain knowledge in relation to the physiology and epidemiology of several diseases, and the use of evidence-based nutritional guidelines for diseases' treatment. By the end of the course, students are expected to:

- Describe the diseases' epidemiology in adulthood
- Identify high risk patients
- Assess the nutritional status of acute and chronic disease patients
- Make and prioritize nutrition diagnoses for patients with acute or chronic diseases of gastrointestinal tract/liver/ pancreas/bladder/kidneys and cancer
- Decide and describe the nutrition intervention and nutrition counseling for the acute or chronic diseases of gastrointestinal tract/ liver/ pancreas/ bladder/ kidneys and cancer
- Supervise the patient diet and guide him/her appropriately to enhance compliance with the MNT

• Monitor and evaluate the nutrition intervention (MNT) using validated markers and outcomes and redesign the nutrition intervention according to the patients' needs	
General abilities	
In the context of this course the trainee develops general skills in: • scientific literature search, analysis, and synthesis by using the appropriate technology • critical thinking for deciding on the proper MNT strategy • team working • working in interdisciplinary groups • Finally, the trainee learns to develop presentation and writing skills	
CONTENT OF THE COURSE	
The content gives emphasis on the nutrition assessment, nutrition diagnosis, nutrition intervention and nutrition monitor and evaluation of patients with the aim to improve their health and quality of life. Specifically, the course covers the following topics: • Medical nutrition therapy (definition, types, routes of feeding) • Gastroesophageal reflux • Inflammatory Bowel Diseases (irritable bowel and Crohn's disease) • Alcoholic and non-alcoholic liver disease • Cirrhosis • Acute and chronic pancreatitis • Acute and chronic bladder disease • Dysphagia • Cancer • Acute and chronic kidney disease	
TEACHING and LEARNING METHODS – EVALUATION	
DELIVERY METHODS	Face-to-face / In vivo - through internet during CONVID19 measures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. • Email, Skype (communication with students)

WAYS OF TEACHING

Activities	Workload of semester
Lectures (2X12)	24
Tutorials	24
Literature research and critical reading	10
Laboratory exercises	24
Homework	10
Reading	58
Overall	**150**

STUDENTS' EVALUATION

13. Final written exam test
14. Homework and class presentations of group coursework
15. Attendance and participation in course discussions
16. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.

RECOMMENDED LITERATURE

- Mahan L.K., and Raymond JL. Krause's Food and The Nutrition Care process. 14th Edition, Elsevier Inc., Missouri, 2017
- Nelms M, Sucher KP, Lacey K. Nutrition therapy and Pathophysiology. 3rd Edition, Cengage Learning, Boston, 2016

NUTRITIONAL EPIDEMIOLOGY

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD35	Semester	6th
COURSE TITLE	NUTRITIONAL EPIDEMIOLOGY		
TEACHING ACTIVITIES		HOURS PER WEEK	CREDITS
Lectures		3	4
TYPE OF COURSE	Mandatory		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)			

LEARNING OUTCOMES

The aim of the course is to provide an indepth understanding of the principles and the use of nutritional epidemiology within the context of public health. The trainees gain knowledge in relation to different study designs, nutritional policies, epidemiology of non-communicable diseases, and the development of evidence-based nutritional guidelines for primary and secondary prevention of non-communicable diseases and obesity. By the end of the course, students are expected to:

- understand the role of nutrition and other enviromental factors in disease aetiology,
- know the advantages and disadvantages oϕ different study desings used in nutritional epidemiology and their influence on research obervations,
- recognise the influece of socioo-economic inequalities in dietary choices and overall health,
- know and understand the importance of evidence-based practice,
- know the epidemiology of the non-communicable diseaseas.

General abilities

In the context of this course:

•The trainee acquires knowledge in the design and interpretation of nutritional epidemiological studies.

•The trainee understands the importance of evidence-based dietetic practice and how to best apply international and national recommendations in disease prevention and dietary management.
•Finally the trainee learns to work harmoniously in groups, to review and appraise successfully the scientific literature and to develop presentation and writing skills.dfbdf

CONTENT OF THE COURSE

The content gives emphasis on the use and applications of nutritional epidemiology in disease prevention. Specifically, the course covers the following topics:

- Nutrition research studies
- Causality and dietary intake
- Biochemical and physical activity indicators in nutritional studies
- Evidence-based nutritional recommendations
- Food insecurity
- Diet and cancer
- Diet and diabetes
- Diet and cardiovascular health
- Diet and obesity
- Nutritional policies

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo - through internet during CONVID19 measures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. • Email, Skype (communication with students)
WAYS OF TEACHING	

Activities	*Workload of semester*
Lectures (2X12)	24
Learning lab	12
Essay	10
Reading	54
Overall	100

STUDENTS' EVALUATION	1. Final written exam test 2. Homework and class presentations of group coursework 3. Attendance and participation in course discussions 4. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.

RECOMMENDED LITERATURE

- Willet W. Nutritional Epidemiology. 3rd Edition, Oxford, 2013.
- Gibney, J.M., Margetts, B.M., Kearney, J.M., Arab, L., Guerrero, S.,.Public Health Nutrition. Blackwell Science Ltd., Oxford, 2004.
- Lovegrove, JA, Hodson, L, Sharma, S. Nutrition research methodologies. Hoboken, NJ: Wiley Blackwell, 2015.

ENVIRONMENTAL Resources and Food Production

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD109	**Semester**	2nd
COURSE TITLE	**Environmental Resources and Food Production**		
TEACHING ACTIVITIES		**HOURS PER WEEK**	**CREDITS**
Lectures		4	6
TYPE OF COURSE	Mandatory		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		

ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/NDS109/

LEARNING OUTCOMES

Food and natural environment are in connection. Its imprint food is terms that occupy the modern concept of sustainability. Inside within the framework of the course are the students will come in contact with the environmental education, technical terms and the combination of food science on issues related to the connection between nutrition and the environment, management water resources and more generally the ecological management of food issues.

General abilities

• In the context of this course:
• The trainee acquires knowledge in the individual metabolic pathways, which constitute the main possibilities of utilization of macronutrients, carbohydrates, lipids, proteins.
• The trainee understands the logic that governs the metabolic processes of macronutrients (carbohydrates, lipids, and proteins), their interaction and their utilization in the phenomenon of life.
• Finally the learner learns to organize, analyze and explain experimental data related to the macronutrients and functional components of food.

CONTENT OF THE COURSE

- Philosophy- Ethics and Ecology: Cultivating the ethical values presented through the definitions of environmental education from the 1970s to date and the connection of the ecological crisis with man.
- The right to food and the connection of ecological creation with nutrition: A methodological approach to the teaching of its environmental footprint food.
- Footprint of food in the natural environment: a) Agriculture and food production, b) Livestock, c) The food industry, d) Transportation and distribution of food to the consumer, e) Loss and waste of food.
- The Mediterranean diet and the natural environment: issues a) awareness raising, b) behavior and c) skills development.
- -Development and respect for the environment: a) Green Paper on the environment, b) The environment as an economic asset, c) Environmental protection and sustainable development, d) Professional activity in environmental issues.
- -Guide to Legislation for the protection of the natural environment.

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo - through internet during CONVID19 measures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. • Email, Skype (communication with students)
WAYS OF TEACHING	

Activities	***Workload of semester***
Lectures (2X12)	52
Experiential activities	0
Homework	10

	Reading	20
	Overall	**82**
STUDENTS' EVALUATION	5. Final exam test by critical written questions 6. Homework and class presentations of group projects 7. Group Discussions 8. Self-Assessments 9. Attendance and Participation 10. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.	
RECOMMENDED LITERATURE		

- Michael P. Todaro, Stephen C Smith, Economic Development, Pearson Education, 2020 ISBN 1292291206
- Patricia Birnie, Alan Boyle, International law and the environment Catherine Redgwell.—3rd ed., ISBN 978–0–19–876422–9

Nutrition Research Methodology

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Nutrition and Dietetics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	YD19	**Semester**	3rd
COURSE TITLE	Nutrition Research Methodology		

TEACHING ACTIVITIES	**HOURS PER WEEK**	**CREDITS**
Lectures	3	2
TYPE OF COURSE	Mandatory	

PREREQUISITE COURSE	No
TEACHING LANGUAGE	English
OFFERED TO ERASMUS STUDENTS	Yes
ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/NDS188/

LEARNING OUTCOMES

The aim of the course is introduce the trainees into the basic principles of research methodology including the design of epidemiological and clinical trials, the use of research tools to collect data, issues regarding bioethics, as well as issues related to data analysis and interpretation. Participation at the learning labs will enhance the application of the theoretical knowledge into practice.

General abilities

In the context of this course:

•The trainee acquires knowledge in the design and interpretation of nutritional epidemiological studies.

•The trainee understands the importance of evidence-based nutrition and dietetic practice and how to best apply international and national recommendations in disease prevention and dietary management.

•Finally the trainee learns to work harmoniously in groups, to review and appraise successfully the scientific literature and to develop presentation and writing skills.

CONTENT OF THE COURSE

The content gives emphasis on the use and applications of research methodology on nutrition. Specifically, the course covers the following topics:

- Introduction to scientific research
- Research methodology: research hypothesis, research protocol, sample and population, errors, pilot study.
- Epidemiological studies: cross sectional, case-control and cohort studies
- Clinical trials
- Systematic reviews and meta-analysis
- Bioethics
- Reproducibility and validity of research tools
- Literature search
- Rating the quality of evidence from nutritional epidemiological studies

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of PowerPoint during lectures. ▪ Use of specified software e.g. citation reference manager and web ▪ Email, office hours (communication with students)

WAYS OF TEACHING	***Activities***	***Workload of semester***
	Lectures	12
	Learning lab	24
	Essay	14
	Reading	-
	Overall	**50**
STUDENTS' EVALUATION	11. Final written exam test 12. Homework and class presentations of group coursework 13. Attendance and participation in course discussions 14. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.	
RECOMMENDED LITERATURE		

- Willet W. Nutritional Epidemiology. 3rd Edition, Oxford, 2013.
- Gibney, J.M., Margetts, B.M., Kearney, J.M., Arab, L., Guerrero, S.,.Public Health Nutrition. Blackwell Science Ltd., Oxford, 2004.
- Lovegrove, JA, Hodson, L, Sharma, S. Nutrition research methodologies. Hoboken, NJ: Wiley Blackwell, 2015.
- Friis Robert H., & Sellers Thomas A. Epidemiology and Public Health, Broken Hill Publishers LTD, Limasol, 2011.

DEPARTMENT OF SOCIAL WORK

HERAKLION

DEPARTMENT OF SOCIAL WORK
HERAKLION

1. INTER-PERSONAL RELATIONSHIPS AND WELL-BEING

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Social Work		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE		Semester	SPRING SEMESTER
COURSE TITLE	INTERPERSONAL RELATIONSHIPS AND WELL-BEING		
TEACHING ACTIVITIES		HOURS PER WEEK	CREDITS
	Lectures	3	5
TYPE OF COURSE	Optional		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)	https://eclass.hmu.gr/courses/SW116/		

LEARNING OUTCOMES

This course will introduce the students to the psychology of human relationships. It will address knowledge and skills needed for positive relationships in community, family and career settings. Its primary focus will be romantic relationships, although other kinds of close relationships (e.g., family, friends, work relationships) will also be discussed. The goals of this course are: (1) to provide students with a comprehensive overview of the research in relationship psychology and of its underlying theories, (2) to help students acknowledge the significance of interpersonal relationships, (3) to help students discern those problem situations in which interpersonal skills are required, (4) to cope with unhealthy relationships and respond non-violently, with awareness and empathy, (5) to learn how to effectively apply knowledge in daily living. The course is largely experiential as it includes a lot of classroom activities.

Hopefully, by successfully completing this course the students will have the skills to:

- identify and describe the core theories involved in relationships research,
- interpret, critically evaluate, and discuss scientific research on relationships,
- acknowledge the significance of interpersonal relationships,
- develop a better understanding of self and others in terms of how we relate to others (self-Disclosure),
- have the skills needed to develop and maintain healthy interpersonal relationships, and
- apply knowledge to experiences from the daily life.

General abilities

- Independent work
- Teamwork
- Interdisciplinary work
- Respect of diversity and multicultural environments
- Accountability and sensitivity of gender issues
- Critical thinking and self-criticism
- Advancement of free, creative and inductive thinking

CONTENT OF THE COURSE

1st week: Introduction to the psychology of interpersonal relationships
2nd week: Relationships in modern society
3rd week: Impact on health, mental health, well-being and happiness
4th week: Psychological resilience and social networks
5th week: Theories of interpersonal relationships
6th week: Assessment of interpersonal relationships
7th week: Kindness and forgiveness
8th week: Stress, conflicts and conflict resolution
9th week: Infidelity, Betrayal and jealousy
10th week: Coercion, manipulation, exploitation and interpersonal violence
11th week: Interpersonal skills and coping strategies
12th week: Compassionate, empathetic or non-violent communication
13th week: Dissolution and Loss

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face / In vivo

USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	▪ Support of learning process through the asynchronous platform e-class ▪ Use of powerpoint during lectures. ▪ Use of video/DVD during lectures. • Email, fb, Skype (communication with students)
WAYS OF TEACHING	

Activities	*Workload of semester*
Lectures (3X13)	39
Experiential activities	13
Homeworks	20
Reading	48
Overall	120

STUDENTS' EVALUATION	1. Final exam test of **multiple choice type** 2. Homeworks and class presentations of group projects 3. Group Discussions 4. Self-Assessments 5. Attendance and Participation 6. Assessment criteria are referred upon e-class. Exam degrees are uploaded at e-class and exam papers are available to students.

RECOMMENDED LITERATURE

Armour, M. P., & Umbreit, M. S. (2005). The paradox of forgiveness in restorative justice. In E. L. Worthington Jr (ed.), Handbook of forgiveness. New York, NY: Routledge. Available online at http://fetzer.org/sites/default/files/images/Parodox_of_Forgiveness_in_RJ.pdf

Harvey, J. H., Pauwels, B. G., & Zicklund, S. (2001). Relationship connection: The role of mnding in the enhancement of closeness. In C. R. Snyder & S. J. Lopez (Eds.), The handbook of positive psychology (pp. 423-233). New York, NY: Oxford University Press.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. Journal of personality and social psychology, 52(3), 511-524.

Lyubomirsky, S (2011). The How of Happiness. A Practical Guide to Getting the Life You Want. New York: The Penguin Press

Lyubomirsky, S. (2013). The myths of happiness: What should make you happy, but doesn't, what shouldn't make you happy, but does. New York, NY: Penguin.

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Tedeschi, R. G.. & Calhoun. L. G. (1996). The postraumatic growth inventory: Measuring the positive legacy of trauma. Journal of Traumatic Stress. 9, 455-471.
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Arnold, D., Calhoun, L. G., Tedeschi, R., & Cann, A. (2005). Vicarious posttraumatic growth in psychotherapy. Journal of Humanistic Psychology, 45(2), 239-263.
Park, C. L. (2010). Making sense of the meaning literature: an integrative review of meaning making and its effects on adjustment to stressful life events. Psychological bulletin, 136(2), 257-301. Available online at http://www.researchgate.net/publication/41654706_Making_sense_of_the_meaning_literature_an_integrative_review_of_meaning_making_and_its_effects_on_adjustment_to_stressful_life_events/file/32bfe5124f7cac0c86.pdf

2.FIELD PRACTICE-SUPERVISION III

GENERAL INFORMATION			
SCHOOL	School of Health Sciences		
DEPARTMENT	Social Work		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE		SEMESTER	SPRING & WINTER SEMESTER
COURSE TITLE	FIELD PRACTICE – SUPERVISION III		
TEACHING ACTIVITIES	HOURS PER WEEK	CREDITS	
(subject to 32 hours of weekly work with social organization activities)	3 hours group supervision	14	
TYPE OF COURSE	Obligatory /Social Work		
PREREQUISITE COURSE	5. Field Practical-Supervision III 6. Community Development & Social Work 7. Social Work with a Family		
TEACHING LANGUAGE	Greek		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)			

LEARNING OUTCOMES

Practical Training - Supervision III main objective is to consolidate and expand the knowledge and skills acquired during Practical Laboratory Exercise II, so that they can realize the professional role of the social worker without special guidance from the supervisor / supervisor.

Upon successful completion of the course, students will be able to:

• Consciously associate the theoretical approaches of Social Work with implementation, having the capacity of an integrated cross-method approach. If the intervention concerns the individual-family, they deepen on counseling issues aimed at restoring social functioning, empowering a person-family. If community involvement goes deeper into community development strategies aimed at improving living conditions.

• Have developed professional role awareness through responsibility, initiative development, development of interdisciplinary cooperation, respecting the principles and values of Social Work.

• Use the knowledge and skills acquired during the training as well as the opportunities offered by the Organization to help prevent and address modern social problems of individuals, families, groups and communities
• Understand the role of the social worker in investigating - identifying social needs, designing and submitting proposals for implementing social programs at the local level.
• Use sources - programs (National, European Union programs) to meet social needs.
• Develop initiatives and promote innovation in the development and implementation of programs
• Promote dynamics of self-help and activation of the population in order to meet social needs.
• Contribute to the development of the interconnection of Social Services in order to better meet the needs of the community and the community
In relation to Surveillance III, students are expected to:
• Have developed an integrated ability to record and present (written and spoken) their work
• Associate theoretical knowledge with the implementation of social work
• Promote teamwork in the context of educational supervision
• Present their work to the supervisory team in a clear and comprehensive way
• Effectively deal with their own emotional involvement, attitudes and prejudices that affect their relationship with the Service's employees and staff
• They have developed a social worker identity

General abilities

- General Capabilities
- Decision making
- Autonomous Work
- Teamwork
- Working in an interdisciplinary environment
- Design and Management of Projects, Interventions
- Respect for diversity and multiculturalism
- Exercise of criticism and self-criticism
- Promoting free, creative and inductive thinking

CONTENT OF THE COURSE

The laboratory lesson "Practical Laboratory Exercise-Supervision III consists of:
1. Practical Laboratory Exercise III conducted in selected Social Services / Practice Exercises Organizations selected by the Department. Practical Laboratory III aims to familiarize students with the implementation of social work in the framework of the operation of Social Organizations, to acquire a professional identity, to empower them so that they can function as social workers, achieving autonomy from the supervisor. Trainees make use of the knowledge and skills they have acquired during the training, as well as the opportunities offered by the Organization to help prevent and address modern social problems of individuals, families, groups and communities.
2. The 3-hour Group II Supervision which supports Practical Laboratory Exercise III and is performed on a weekly basis by members of the faculty, EDIP and scientific associates (PD 407) of the Social Worker's Specialty.

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face to face, small supervision groups
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	• Support Learning Process via the e-class e-class platform • Communicating with students via email
WAYS OF TEACHING	

Activities	Workload of semester
Practical Exercise	200
Group supervision	50
Writing reports	30
Presentation of work	30
Study & Analysis of Literature	10
Case Study-Analysis	30
Individual / group exercises	30
Independent Study	40
Total	***420***

STUDENTS' EVALUATION	The presence of the student is necessary in both parts (Practice in the Organization and weekly group supervision) Required attendance rate of 80%, while the final grade of the course is evaluated both. Required is the fulfillment of specific educational criteria, according to the expected learning outcomes. Educational evaluation criteria are accessible to students in the e-class During the semester; the group supervises an intermediate assessment (including self-assessment of the student) as well as a final evaluation.

RECOMMENDED LITERATURE

Archondakis, Z, and Philippou, D. (2003). 205 Experiential Exercises for Group Involvement. Athens: Kastaniotis.
Yiotakos, O, Tsiliakou, M., Tsitsika, A. & Tsouvelas, G. (2014). New forms of child and adolescent abuse. Athens: Beta Medical Publications.
Collins, D., Jordan, C. & Coleman, H. (2017). Social Work with Family. Sci. Ep. C. Asimopoulos & S. Martinaki. Athens: Beta Publications.
Dimopoulou-Lagonika, M. (2007). Social Work Methodology - Intervention Models. Athens: Greek Letters.
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Hellenic Gerontological and Geriatric Society (2004). Elderly Parents Care Guide. Athens: Mendor.
Zaimakis, G. & Kandylaki, A. (eds.) (2005). Social protection networks: Forms of intervention in vulnerable social groups. Athens: Criticism.
Zoniou-Sideris, A. & Spandagou, H. (2011). Education and blindness. Collective. Athens: Field.
Zoniou-Sideris, A., Deropoulou-Derou, E. & Vlachou-Balafouti, A. (eds.) (2012).
Disability and educational policy. Critical Approach to Special and Inclusive Education. Collective work. Athens: Field.
Karagiannis, G. (2017). The disability in Greece of the crisis. Athens: Gutenberg.
Karagounis, B. (2008). Community work and local development. Athens: Place.
Kastoriadou-Papadopoulou, Ch. (2009). Social Work with Groups. Atanna: Hellenic -G. Patrikos & Co Ltd.

Kounti-Chronopoulou, K., Tedaki, M. & Passa, M. (eds.) (2015). The Contribution of Social Work to Psychiatric Therapeutics. A Psychiatric Clinic of the University of Athens, Eginiteio Hospital. Collective Work. Coordinator G. Papadimitriou. Athens: Paris.
Marwedel, U. (2009). Gerontology & Gerontopsychiatry. Athens: Ion.
Moores, D. (2011). Education and deafness. Ep. A. Zoniou-Sideris & E. Deropoulou-Derou. Athens: Field.
Mosesidis, A., Anthopoulou, Th. & Dukken, M.N., (2002). The elderly in the rural area. Athens: Gutenberg. Oliver, M. (2009) .Understanding Disability - From Theory to Practice (2nd Edn). Basingstoke: Macmillan.
Related scientific journals:
Social work
The Step of Social Sciences
Social Research Survey
Social Work
European Social Work
Community practice
British Journal of Social Work
Child & Family Social Work

3. DOMESTIC VIOLENCE AND SOCIAL WORK PRACTICE

School	School of Health Sciences		
Department	Social Work		
Level of study	Undergraduate		
Course code	YK70E3	SEMESTER	WINTER SEMESTER
Title of course	DOMESTIC VIOLENCE AND SOCIAL WORK PRACTICE		
TEACHING ACTIVITIES		**HOURS PER WEEK**	**CREDITS**
Lectures		3	
Total		3	5
TYPE OF COURSE	Optional		
PREREQUISITE COURSE	No		
TEACHING LANGUAGE	English		
OFFERED TO ERASMUS STUDENTS	Yes		
ONLINE COURSE PAGE (URL)			

LEARNING OUTCOMES

The lesson aims to raise students' awareness on domestic violence issues, to improve their knowledge and reinforce their skills in addressing and dealing efficiently with abused people in the health and social care settings. At the end of the course students should be able to:

- Gain understanding of the dynamics and consequences of violence
- Develop clinical skills needed to screen for violence, assess risk, provide counselling and document violent situations in charts and referrals.
- Understand the law implementation process for domestic violence cases and become aware of the referral resources and procedures.

GENERAL SKILLS

- Collection and synthesis of information
- Decision making
- Individual work
- Interdisciplinary work
- Professional responsibility

- Critical thinking
- Self-evaluation

CONTENT OF THE COURSE

- Theory of violence
- Risk factors and consequences
- Clinical indicators of domestic violence
- Clinical protocols and practice guidelines for the identification and management of domestic violence
- Cultural competency in responding to domestic violence victims
- Screening for domestic violence
- Interviewing basics, barriers to interviewing, sensitive questioning
- Recording and documentation of domestic violence
- Information sharing
- Counselling techniques
- Referral – networking
- Reporting requirements - Mandatory reporting
- Legal framework

TEACHING and LEARNING METHODS – EVALUATION

DELIVERY METHODS	Face-to-face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Communication through e-class platform
WAYS OF TEACHING	Lectures Problem solving Case studies Role playing Small-group task-oriented discussions Individual reading
STUDENTS' EVALUATION	I. Final written examinations (70%) II. Evaluation of practical skills (30%)

RECOMMENDED LITERATURE

Roberts, G., Hegarty, K., & Feder, G. (2006). *Intimate partner abuse and health professionals: New approaches to domestic violence.* Edinburgh: Churchill Livingstone.
McClennen, J. C. (2010*). Social Work and Family Violence: Theories, Assessment, and Intervention*. NY: Springer.