UNIVERSITY OF WEST ATTICA
SCHOOL OF ENGINEERING
DEPT. OF BIOMEDICAL ENGINEERING

STUDY REGULATIONS

MSc BIOMEDICAL ENGINEERING AND TECHONOLOGY

DEPARTMENT OF BIOMEDICAL ENGINEERING

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DEPARTMENT OF BIOMEDICAL ENGINEERING
UNIVERSITY OF WEST ATTICA, EGALEO PARK CAMPUS
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Preface

The MSc program “Biomedical Engineering and Technology" is organised by the Department of Biomedical Engineering which belongs to the School of Engineering of the University of West Attica.

Biomedical Engineering is an independent scientific subject based on the confluence of Engineering and Science with Life and Health Sciences. The Department of Biomedical Engineering of the University of West Attica is the only academic department in Greece that currently offers undergraduate, postgraduate and doctoral studies in Biomedical Engineering and Technology.

Graduates in the specialty of Biomedical Engineering, and specifically graduates of the Department, have always had and continue to have excellent career prospects. Biomedical Engineers can be employed in the private and public sectors to study, design, manufacture, install and commission, test, maintain and distribute medical devices, scientific instruments and machinery, as well as with the development and use of software for any type of application in the Life and Health Sciences. In public hospitals, there are positions for Biomedical Engineers and there is a high demand from medical equipment companies. The Biomedical Directorate of the Ministry of Health has proposed to strengthen the role of the respective departments in hospitals.

The scientific activity of the Department and the teaching staff of the MSc is intense with a high number of research papers and participations in national and international conferences, participation in research projects funded by Greece and the European Union, support of doctoral and postdoctoral research, etc.

The Department and the MSc program ensure their continuous evaluation following the rules of the Hellenic Authority for Higher Education (HAHE). The undergraduate study program of the Department was evaluated and accredited by HAHE in August 2023. The MSc program "Biomedical Engineering and Technology" of the Department was evaluated and accredited by the international organization ACQUIN. It will also submit a dossier for Evaluation and Accreditation by the HAHE within the academic year 2023-2024.

Athens, December 2023

Table of Contents

The MSc "Biomedical Engineering and Technology"

Duration: 3 academic semesters (90 ECTS)
Teaching language: English
Webpage: https://bmet.uniwa.gr/
Approval: Government Gazette 6019/B/20-12-2021

The English language MSc Biomedical Engineering and Technology (Presentation Video: 1, 2, 3) aims to create the necessary foundations for the development of the participants, both at research and professional level, in the rapidly developing field of Biomedical Engineering and Technology. The programme covers a wide range of disciplines and fields, including in vitro diagnostics, in vivo diagnostics, medical imaging, emergency medicine technologies, rehabilitation technologies, biomedical informatics, artificial intelligence, deep learning, ethics in biomedical engineering, economics, management, marketing and sales in biomedical engineering, research and development in biomedical engineering, and an inventory and immersion in the different aspects of the biomedical engineering profession. The MSc emphasizes the acquisition of theoretical knowledge and practical skills to create postgraduates with high theoretical training, expertise and practical experience to fully respond to positions of increased responsibility and compatible needs imposed by the rapid technological developments in the global labour market in the field of Biomedical Engineering.

The MSc is designed focusing on the **extroversion** of the Department and the University **towards industry, the labour market and the international educational environment in the rapidly developing field of Biomedical Engineering and Technology**. The strong extroversion of the programme is demonstrated by the following features:

a/ the MSc focuses on cooperation with companies in the field of Biomedical Engineering, which actively participate in the implementation of the teaching of the courses through special seminars, demonstrations and field visits, which favour the acquaintance of the students of the programme with the real conditions of the labour market.

b/ the MSc focuses on internationalisation through collaborations with universities abroad and the participation in teaching of researchers, scientific staff and faculty members from foreign universities. Currently, the programme involves faculty from six different universities/institutes abroad: 1. Politécnico do Porto, PORTUGAL, 2. Universidad Rey Juan Carlos, SPAIN, 3. Politehnica University of Bucharest, ROMANIA, 4. Georgia Institute of Technology, USA, 5. Trier University of Applied Sciences, GERMANY και 6. University of Plymouth, UK. The MSc has signed special transnational agreement with the MSc Medical Engineering, University of Plymouth, UK for the transfer of students on preferential terms for one semester at the University of Plymouth.

c/ the MSc aims to attract students from abroad through the organisation of a modern programme of study entirely in English with competitive **low tuition fees**, which enhances the internationalisation strategies of the Department, the School and the University.

d/ the structure and composition of the curriculum makes use of modern educational approaches to deepen the knowledge of the subject, to encourage self-motivation and to practice research methodology, which will contribute to the better preparation of students for their future professional and/or research careers.

e/ the structure and composition of the curriculum is addressed to graduates of related subjects who would like to get to know and deepen their knowledge in an intensive way in selected areas of Biomedical Engineering (career change, conversion program).

f/ the MSc is the only one taught in English in the scientific field of Biomedical Engineering in the region of Attica, the most populous region of the country.

Scientific conferences: Although the MSc is only in its 2nd year of operation, it already organized its international conference entitled Advances in Biomedical Sciences, Engineering and Technology (ABSET) conference, 10-11 June 2023, at the conference centre of the University Campus Egaleo of the University of West Attica.

Summer School: Within the framework of the transnational collaborations of the MSc, an international summer school has already taken place in the scientific field 'Machine Learning Applications in Medicine', 05-09 June 2023, at University of West Attica, co-organised with the MSc Interdisciplinary Engineering, Trier University of Applied Sciences, Germany. The international summer school will be repeated in summer 2024 on the premises of Trier University of Applied Sciences in Germany.

European Cooparation – Erasmus+: The MSc has conducted agreements with academic institutions of higher education in the European Union for the exchange of students and teaching staff under the Erasmus+ programme in the field of biomedical engineering.

Evaluation and Quality Policy of the Department: The MSc ensures its continuous evaluation following the rules of the Quality Assurance Authority and the Quality Policy of the Department of Biomedical Engineering.

The MSc was successfully assessed and accredited in September 2023 by the International Accreditation Organization The Accreditation, Certification and Quality Assurance Institute (ACQUIN), and will immediately apply for accreditation from the National Authority for Higher Education HAHE.

Administrative bodies of the MSc program

The governing bodies of the MSc are:

- The Senate of the UniWA
- The Departmental Assembly (DA)
- The Steering Committee (SC)
- The Coordinator of the MSc program

Assembly of the Department of Biomedical Engineering:

The Assembly of the Department consists of all the Faculty Members of the Department, one (1) representative of Laboratory Teaching Personnel, one (1) representative of Special Technical Laboratory Personnel (not appointed) and student representatives (not appointed): Fuculty Members

- Panteleimon Asvestas, Professor
- Ioannis Valais, Professor
- Errikos Ventouras, Professor
- Dimitrios Glotsos, Professor
- Ioannis Kalatzis, Professor (President of the Department)
- Maria kallergi, Professor
- Anastasios Dounis, Professor
- Evangelia Patsavoudi, Professor
- Aikaterini Skouroliakou, Professor (Vice-President of the Department)
- George Fountos, Professor
- Nektarios Kalyvas, Associate Professor
- Spiros Kostopoulos, Associate Professor
- Panagiotis Liaparinos, Associate Professor
- Panayiotis Moustanis, Associate Professor
- Emmanouil Athanasiadis, Assistant Professor
- Efstratios David, Assistant Professor
- Minos Matsoukas, Assistant Professor
- Christos Michail, Assistant Professor
- Evangelia Pantatosaki, Assistant Professor

Representative of Laboratory Teaching Personnel

- Panagiotis Korkidis, Laboratory Teaching Personnel

The Steering Committee of the MSc Program:

The steering committee consists of 5 Faculty Members, of which one Faculty Member is the Director of the MSc:

Faculty Members

- Dimitrios Glotsos, Professor (Director of the MSc)
- Spiros Kostopoulos, Associate Professor
- Panagiotis Liaparinos, Associate Professor

- Efstratios David, Assistant Professor
- Emmanouil Athanasiadis, Assistant Professor

Quality Policy of the MSc.

The MSc program "Biomedical Engineering and Technology" of the Department of Biomedical Engineering of the University of West Attica remains committed to providing high-quality higher education and specialisation to its students and developing the appropriate conditions for a creative research and working environment for its staff. It is a primary management and responsibility choice of the teaching/research staff, whether national or foreign and the administrative staff, to the continuous improvement of teaching, research work and services provided by the MSc.

The MSc has established and implemented a specific quality policy, which is fully harmonized with the quality policy of the Department of Biomedical Engineering and also fully connected to the legal and regulatory framework governing the operation of the University of West Attica. In cooperation with the Quality Assurance Unit (QA) of the University of West Attica, the MSc has harmonized its Quality Policy following the principles of the Quality Policy of the Institution (Decision of the Senate of the Institution, 4th meeting, 08-05-2020).

Through the establishment, evaluation and redefinition of the quality policy, the MSc is committed to achieving even higher performance. This strategy will highlight values, standards and examples to contribute to the institution's pursuit of high-quality teaching and research outcomes that will contribute to a steady path of development for the country.

The objectives of the MSc are:

i) the creation of a strong background in the subjects treated by the MSc but also the interdisciplinarity, given the nature of the biomedical engineering subject,
ii) the preparation of the professional career of its graduates through the understanding of science with modern technological tools and methods, based on Greek and foreign literature,
iii) developing the ability of its graduates, in a rapidly evolving society and global economy, to continue their intellectual development.

All the activities of the MSc aim at the continuous development of a flexible and modern curriculum. In addition, the mission of the MSc is to play an active role in local communities.

Quality Policy Disclosure
The quality policy of the MSc is made public, disseminated to the teaching and administrative staff of the MSc and the students, so that they all assume responsibility for quality assurance. Students are informed about the quality policy of the MSc and

the University in general, from the beginning of their studies, in the context of the special welcome event for new students.

Research Laboratories

The Department of Biomedical Engineering has two (2) officially established Research Laboratories that contribute educationally and research-wise to the organization of the MSc:

Laboratory of Radiation Physics, Materials Technology and Biomedical Imaging, (AKTYBA) (Government Gazette Establishment 695/B/2019) under the direction of Professor G. Fountos. The Laboratory is active in research and education in the field of radiation physics (ionizing and non-ionizing), radiation detectors, quantitative determination of biological parameters, tissue characterization, biomedical instrumentation, image science, materials technology in materials of radiological interest and biomedical applications, electronic and mechanical engineering in biomedical applications, device calibration, clinical imaging and quality control. A group is also established in the laboratory that is active in the field of Humanities (Sociology, History, Philosophy) of Science and Technology.

Medical Signal and Image Laboratory (MEDISP) (Government Gazette Establishment 825/B/2019) under the direction of Associate Professor S. Kostopoulos. The Laboratory is active in education and research in medical signal and image processing and analysis, pattern recognition in medical and biological applications, bioinformatics, medical informatics and medical statistics, medical electronics, microprocessor and microcontroller programming in digital medical systems, telemedicine and remote medical imaging, applications of artificial intelligence in medicine and biology, and robotics.

Scientific Teaching Staff of the MSc.

The teaching staff of the MSc consists of renowned professors from 8 different universities in Greece and abroad.:

- University of West Attica, Greece
- National Kapodistrian University of Athens, Greece
- Georgia Institute of Technology, United States of America
- University of Plymouth, United Kingdom
- Politécnico do Porto, Portugal
- Hochschule Trier, Germany
- Universidad Rey Juan Carlos, Spain
- Politehnica University of Bucharest, Romania

Teaching staff

- Arvanitis Costas, Associate Prof., Georgia Institute of Technology, George W. Woodruff School of Mechanical Engineering, USA, costas.arvanitis@gatech.edu.

  Knowledge and research interests: Biomedical ultrasound and image-guided ultrasound therapy. Therapeutic applications of ultrasound with emphasis on brain cancer and central nervous system diseases and disorders.

  Modules: BMET201. Diagnostic Medical Imaging Systems

- Athanasiadis Emmanouil, Assistant Prof., Department of Biomedical Engineering, University of West Attica, Greece, mathan@uniwa.gr

  Knowledge and research interests: Computational Biology and Medical Informatics.

  Modules: BMET206. Bioinformatics (Module Coordinator), BMET104. The Biomedical engineering industry sector I, BMET203. The Biomedical engineering industry sector II, BMET105. Biostatistics, BMET101. The science of biomedical engineering

- Valais Ioannis, Prof., Department of Biomedical Engineering, University of West Attica, Greece, valais@uniwa.gr

  Knowledge and research interests: Evaluation of phosphors and monocrystals for use in medical imaging, Electronics and mechanical engineering for the improvement of medical equipment, quality assurance for nuclear medicine imaging systems, protocols for quantitative and qualitative testing of medical equipment.

  Modules: BMET108. Quality Assurance and Medical Device Regulations (Module Coordinator)

- Ventouras Erricos, Prof., Department of Biomedical Engineering, University of West Attica, Greece, ericvent@uniwa.gr

  Knowledge and research interests: Biomedical signal acquisition and processing, computer-based diagnostic systems, machine learning, electro- and magnetoencephalography, neurological and behavioral monitoring, brain source imaging, and computer-based examination systems.

  Module: BMET202. Biomedical Instrumentation

- Besinis Alexander, Associate Prof. in Mechanical Engineering, School of Engineering, University of Plymouth, UK, alexander.besinis@plymouth.ac.uk

Knowledge and research interests: Advanced materials engineering and the use of nanotechnology to fabricate new composites, biomaterials and implants with improved mechanical and physical properties.

Module: BMET109. Biomechanics and Biomaterials

- Vlantoni Aikaterini, Dr., Postdoc Researcher, Department of History and Philosophy of Science, School of Sciences, National and Kapodistrian University of Athens (NKUA), Greece, avlantoni@uniwa.gr

  Knowledge and research interests: Historical and STS study of medical/biomedical science and technology.

  Modules: BMET209. Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics

- Glotsos Dimitris, Prof., Department of Biomedical Engineering, University of West Attica, Greece, dimglo@uniwa.gr

  Knowledge and research interests: Decision support systems in medicine and biology, medical image processing and analysis and microscopy.

  Modules: BMET101. The science of biomedical engineering (Module Coordinator), BMET102. Research methodology (Module Coordinator), BMET104. The Biomedical engineering industry sector I (Module Coordinator), BMET203. The Biomedical engineering industry sector II (Module Coordinator), BMET202. Biomedical Instrumentation (Module Coordinator)

- Coelho Luis Pinto, Prof., Instituto Superior De Engenharia do Porto (ISEP), Politécnico do Porto, Portugal, lfc@isep.ipp.pt

  Knowledge and research interests: Entrepreneurship, Mobile Application Development (Android, iOS and Windows), Signal Processing, Pattern Recognition, Speech Synthesis and Speech Recognition, Industrial Automation.

  Modules: BMET207. Human machine interaction in healthcare (Module Coordinator)

- David Efstratios, Assistant Prof., Department of Biomedical Engineering, University of West Attica, Greece, sdavid@uniwa.gr

  Knowledge and research interests: Evaluation of single crystal scintillators and phosphors in medical imaging detectors - effect of fluorescent materials on detector performance, medical device instrumentation, SPECT and PET nuclear medical imaging detectors, signal reduction resistor circuits, molecular imaging technologies with medical applications.

Modules: BMET201. Diagnostic Medical Imaging Systems (Module Coordinator), BMET104. The Biomedical engineering industry sector I, BMET203. The Biomedical engineering industry sector II, BMET101. The science of biomedical engineering

- Zoumpoulakis Panagiotis, Associate Prof., Department of Food Science and Technology, University of West Attica, Greece, pzoump@uniwa.gr

  Knowledge and research interests: Molecular design and bioanalysis, innovation, technology transfer and start-up entrepreneurship.

  Module: BMET107. Biomedical marketing (Module Coordinator)

- Thomaidou Dimitra, Director of Research (Researcher A') at the Department of Neurobiology of. Head of the Department of Neurobiology at the Hellenic Pasteur Institute (HIP) and Scientific Director of the Optics Unit, Greece dthomaidou@uniwa.gr

  Knowledge and research interests: Neuroscience, Neuroimaging, adult neurogenesis and the biology of Neural Stem Cells.

  Module: BMET103. Biology-Biotechnology

- Cavouras Dionisis, Prof. Emeritus, Department of Biomedical Engineering, University of West Attica, Greece, cavouras@uniwa.gr

  Knowledge and research interests: Medical image processing, image analysis, machine learning, statistical analysis of medical data and medical physics.

  Modules: BMET106. Medical signal and image processing (Module Coordinator), BMET208. Machine Learning in Medicine and Biology (Module Coordinatos)

- Kandarakis Ioannis, Prof. Emeritus, Department of Biomedical Engineering, University of West Attica, Greece, kandarakis@uniwa.gr

  Knowledge and research interests: Medical imaging detectors, Monte Carlo simulation methods in the physics of diagnostic radiology and nuclear medicine, Evaluation of medical imaging systems using objective image quality measurements, Applications of non-ionizing radiation.

  Modules: BMET209. Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics, BMET201. Diagnostic Medical Imaging Systems

- Koch Klaus Peter, Prof. Dr.-Ing., Hochschule Trier, Germany, koch(@hochschule-trier.de

Knowledge and research interests: Embedded systems for neural implants, design and simulation of electrodes for recording and stimulation, medical electronics and pseudo-signal recording models.

Module: BMET202. Biomedical Instrumentation

- Kostopoulos Spiros, Associate Prof., Department of Biomedical Engineering, University of West Attica, Greece, skostopoulos@uniwa.gr

  Knowledge and research interests: Medical image processing and analysis, decision support systems, pattern recognition, machine learning and bioinformatics.

  Modules: BMET105. Biostatistics (Module Coordinator), BMET206. Bioinformatics, BMET104. The Biomedical engineering industry sector I, BMET203. The Biomedical engineering industry sector II

- Liaparinos Panagiotis, Associate Prof., Department of Biomedical Engineering, University of West Attica, Greece, liapkin@uniwa.gr

  Knowledge and research interests: Monte Carlo simulations for the study of optical diffusion in granular phosphors/scintillators, X-ray detectors, medical physics, biomedical optics.

  Modules: BMET104. The Biomedical engineering industry sector I, BMET203. The Biomedical engineering industry sector II, BMET201. Diagnostic Medical Imaging Systems, BMET101. The science of biomedical engineering

- Loudos George, Dr., Chief Executive Officer, BIOEMTECH, Ελλάδα, gloudos@bioemtech.com

  Knowledge and research interests: Molecular Imaging using Nuclear Medicine Techniques and Medical Instrumentation. Development of specialised imaging systems for SPECT/PET and combined imaging, and their application in pre-clinical research for the study of molecular mechanisms, radiopharmaceuticals and nanoparticle drug delivery.

  Module: BMET104. The Biomedical engineering industry sector I

- Loukos Ioannis, Dr., National Rapid Intervention Centre, Greece, ioannisloukos@gmail.com

  Knowledge and research interests: Emergency medicine, biomaterials, biomechanics, biomechanics, prosthetics.

  Modules: BMET109. Biomechanics and Biomaterials (Module Coordinator), BMET204. Emergency medicine (Module Coordinator)

- Matsoukas Minos, Assistant Prof., Department of Biomedical Engineering, University of West Attica, Greece, mmatsoukas@uniwa.gr

  Knowledge and research interests: Virtual scans of chemoprecipitation databases for the identification of pharmaceutical compounds, understanding the biological action of transmembrane proteins by studying their dynamics using structural biology data.

  Module: BMET206. Bioinformatics

- Michail Chris, Assistant Prof., Department of Biomedical Engineering, University of West Attica, Greece, mmichail@uniwa.gr

  Knowledge and research interests: Development and evaluation of radiation detectors for use in digital imaging systems, development of Dual Energy X-ray methods for breast, bone, etc., image quality evaluation in PET & SPECT systems using Monte Carlo method.

  Modules: BMET108. Quality Assurance and Medical Device Regulations (Module Coordinator)

- Mourao Luis, Prof., Instituto Superior De Engenharia do Porto (ISEP), Politécnico do Porto, Portugal, lnm@isep.ipp.pt

  Knowledge and research interests: Organology, electronics, materials, human-machine interaction.

  Module: BMET207. Human machine interaction in healthcare

- Panayiotou George, Research Director (Researcher A') at the Biomedical Sciences Research Center Alexander Fleming, Greece, g.panayotou@fleming.gr

  Knowledge and research interests: Molecular analysis of signal transduction pathways.

  Module: BMET103. Biology-Biotechnology

- Pantatosaki Evangelia, Assistant Prof., Department of Biomedical Engineering, University of West Attica, Greece, epantatoskai@uniwa.gr

  Knowledge and research interests: Modelling of chemical and biomolecular processes through computational simulations to investigate the structure-property-performance relationship in biomaterial and biochemical systems.

Modules: BMET101. The science of biomedical engineering, BMET109. Biomechanics and Biomaterials

- Patsavoudi Evangelia, Prof., Department of Biomedical Engineering, University of West Attica, Greece, epatsavoudi@uniwa.gr

  Knowledge and research interests: Cellular and molecular oncology. More specifically, her activities include the study of heat shock protein 90 (HSP90) in in vitro and in vivo models of cancer cell invasion and metastasis respectively.

  Module: BMET103. Biology-Biotechnology (Module Coordinator)

- Soguero-Ruiz Cristina, Assistant Prof., Dpto. Teoría de la Señal y Comunicaciones y Sistemas, Universidad Rey Juan Carlos, Spain, cristina.soguero@urjc.es

  Knowledge and research interests: Data science, machine learning with application to healthcare, tourism and finance.

  Module: BMET208. Machine Learning in Medicine and Biology

- Skouroliakou Aikaterni, Prof., Department of Biomedical Engineering, University of West Attica, Greece, kskourol@uniwa.gr

  Knowledge and research interests: Medical imaging techniques, measurement and study of biological effects of non-ionizing electromagnetic radiation.

  Module: BMET101. The science of biomedical engineering

- Tache Irina Andra, Assistant Prof., Faculty of Automatic Control and Computers, Politehnica University of Bucharest, Romania, irina.andra@gmail.com

  Knowledge and research interests: Control systems, automated systems, medical image processing and analysis, artificial intelligence, pattern recognition, machine learning.

  Module: BMET205. Control systems in biomedical engineering

- Tympas Aristotelis, Prof., Director of the Department of History of Science and Technology, Department of History and Philosophy of Science (ΙΦΕ), School of Sciences, National and Kapodistrian University of Athens (NKUA), Greece, tympas@phs.uoa.gr

  Knowledge and research interests: Study of technology through the humanities and social sciences.

Module: BMET209. Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics

- Fountos George, Prof., Department of Biomedical Engineering, University of West Attica, Greece, gfoun@uniwa.gr

  Knowledge and research interests: Body composition using dual energy x-ray techniques, quality assurance and simulations in medical ionizing radiation systems, radiation protection, nuclear medicine and radiology physics, TEM electron microscopy, etc.

  Module BMET201. Diagnostic Medical Imaging Systems

Secretariat Π.Μ.Σ.

- Christina Kontou, bmet@uniwa.gr

Auditoriums - Laboratories

The courses of the MSc are conducted in one auditorium and two laboratories, in buildings K10, K11 and K16 of the University.

Teaching auditoriums

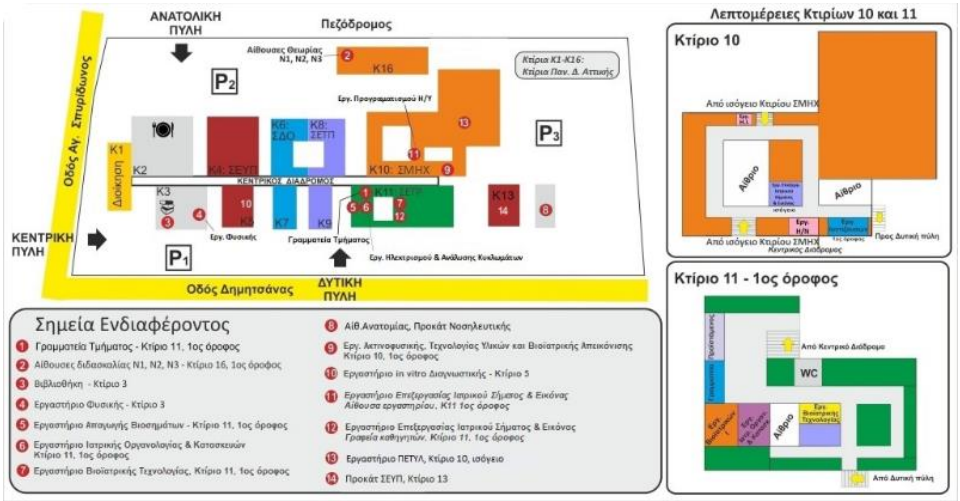
K16.102 1st Floor Building K16 (Hall N2), 56 Seats

Laboratory premises

K10.120 Medical Image and Signal Laboratory, Managers: Assistant Prof. E. Athanasiadis, Prof. D. Glotsos

K11.107 Laboratory of Medical Instrumentation, Manager: Assistant Prof. E. David

Diagram of buildings and classrooms



The postgraduate studies in the MSc "Biomedical Engineering and Technology" last for 3 academic semesters.

The courses are divided into two (2) semesters of study, while the third semester is allocated for the preparation of the Diploma Thesis.

A total of 18 courses are available to students, of which 7 courses are compulsory and 11 courses are elective. In addition, there is the Diploma Thesis, the preparation of which is compulsory.

The total number of courses necessary to obtain the diploma is 13 courses, of which 7 courses are compulsory and 6 courses are elective, and, in addition, the preparation of the Diploma Thesis.

The distribution of the total weekly hours of the courses in Lectures and Laboratory Exercises is indicative and is left to the discretion of the lecturer in charge of each course.

The Diploma Thesis is compulsory with 30 Credit Units. The workload per academic year ranges from 1606-1748 hours.

Learning objectives

Upon completion of the MSc, the graduate is able to:

- Combines knowledge of applied mathematics, basic sciences and engineering sciences to understand and solve problems in biomedical engineering.
- Design and conduct experimental studies in a scientifically sound manner, analyse and interpret data and draw reliable conclusions.
- Identify, synthesise and solve problems related to the design and production of a system, component or process in biomedical engineering.
- Participate in teams of different disciplines, advising and proposing appropriate science-based and innovative solutions.
- Apply knowledge and skills to formulate sound judgements taking into account public health and safety and the relevant social, economic, environmental, cultural and ethical dimensions.
- Develops continuously and autonomously his/her knowledge in the methods and techniques of Biomedical Engineering.

Course registration

At the beginning of each academic semester (except for the 1st semester) students declare which courses they wish to attend in that semester. Students have the right to take any course they wish and to determine their own course and speed of study according to their needs.

Grading

In courses that include Laboratory Exercises, the overall grade is the combination of the final grades of the theoretical and laboratory parts of the course.

Table of courses

The following is a table of courses of the MSc:

1º SEMSTER		
MODULE TITLE	**R: Required E: Elective**	**ECTS**
The science of Biomedical engineering	R	3
Research methodology	R	2
Biology-Biotechnology	R	5
The Biomedical engineering industry sector I	R	5
Biostatistics	E	5
Medical signal and image processing	E	5
Biomedical marketing	E	5
Quality Assurance and Medical Device Regulations	E	5
Biomechanics and Biomaterials	E	5
Total Semester ECTS:		**30**

2º SEMESTER		
MODULE TITLE	**R: Required E: Elective**	**ECTS**
Diagnostic Medical Imaging Systems	R	5
Biomedical Instrumentation	R	5
The Biomedical engineering industry sector II	R	5
Emergency medicine	E	5
Control systems in biomedical engineering	E	5
Bioinformatics	E	5
Human machine interaction in healthcare	E	5
Machine Learning in Medicine and Biology	E	5
Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics	E	5
Total Semester ECTS:		**30**

3º SEMESTER		
MODULE TITLE	**R: Required E: Elective**	**ECTS**
Diploma thesis	R	30
Total Semester ECTS:		**30**

OVERALL TOTAL NUMBER OF CREDITS (ECTS) OF THE PROGRAMME	**90**

Distribution of courses by discipline

Biomedical Engineering is an interdisciplinary discipline that is now a separate scientific discipline, characterised by the fusion of Engineering and Science with Life and Health Sciences.

Sciences of Engineering (10 Modules)

A/A	SEMESTER	ID	MODULE
1	A	BMET101	The science of biomedical engineering
2	A	BMET104	The Biomedical engineering industry sector I
3	A	BMET108	Quality assurance and medical device regulations
4	A	BMET109	Biomechanics and biomaterials
5	B	BMET201	Diagnostic Medical Imaging Systems
6	B	BMET202	Biomedical Instrumentation
7	B	BMET203	The Biomedical engineering industry sector II
8	B	BMET204	Emergency medicine
9	B	BMET205	Control systems in biomedical engineering
10	B	BMET206	Bioinformatics
10	B	BMET207	Human machine interaction in healthcare
11	B	BMET208	Machine Learning in Medicine and Biology

Sciences (2 Modules)

A/A	SEMESTER	ID	MODULE
1	A	BMET105	Biostatistics
2	A	BMET102	Research methodology

Medical Sciences (1 Module)

A/A	SEMESTER	ID	MODULE
1	A	BMET103	Biology-Biotechnology

Management and Economic Sciences / Social Sciences (2 Modules)

A/A	SEMESTER	ID	MODULE
1	A	BMET107	Biomedical marketing
2	B	BMET209	Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics

Courses outlines

BMET101 The science of biomedical engineering

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
Prof. A. Skouroliakou, University of West Attica, Greece
Associate Prof. P. Liaparinos, University of West Attica, Greece
Assistant Prof. E. Athanasiadis, University of West Attica, Greece
Assistant Prof. E. David, University of West Attica, Greece
Assistant Prof. E. Pantatosaki, University of West Attica, Greece

Course Objectives:
The purpose of the course is to introduce the science of biomedical engineering. The course will define the scope of biomedical engineering and explain the key areas of biomedical engineering for a wide range of fields such as biomedical instrumentation, medical imaging, medical signal and image processing, biomedical informatics, biomedical optics, biomaterials, neuroengineering, ethics and ethics in biomedical research. Finally, the career prospects and job roles of a biomedical engineer will be analysed.

Learning Outcomes:
1. A comprehensive understanding of the scientific field of biomedical engineering, knowledge of definitions and key concepts.
2. Distinguish and describe the main areas of biomedical engineering.
3. Identify, describe and compare the roles of biomedical engineers in the labor market.

Achievement of course objectives:
In order to meet the above objectives and learning outcomes, students will be taught basic definitions and concepts of biomedical engineering with references to historical development. They will be taught the key areas of biomedical engineering, career prospects of biomedical engineering, research, ethics and ethical issues and regulatory frameworks governing medical devices. In particular, the areas of medical imaging, biomedical instrumentation, biomedical and tissue engineering, biomedical optics, neuroengineering and biomedical informatics will be analysed.

BMET102 Research methodology

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
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Course Objectives:
The course will introduce the basic principles of research methodology (initial hypothesis, data collection, data analysis, publication of results, ethics, and personal data protection issues) and the methodology of drafting scientific articles. Upon completion of this course, students will have a comprehensive understanding of the basic principles of research methodology, they will know how to write a scientific report/essay, and they will be prepared to communicate technical concepts and ideas clearly and concisely through written reports, oral presentations, and visual aids.

Learning Outcomes:
1. Gain a comprehensive understanding of research methodology.
2. Describe and differentiate the different types of research with emphasis the biomedical engineering domain.
3. Recognize and address ethical considerations in research, ensuring responsible conduct throughout the research process.
4. Apply statistical techniques to analyze quantitative and qualitative data, interpreting results and drawing valid conclusions from statistical analyses using relevant software tools.
5. Construct a well-organized and persuasive research proposal, including a clear introduction, literature review, methodology, and ethical considerations.
6. Produce clear and concise research reports, with appropriate formatting and citation styles, and communicate research findings to diverse audiences through written assignments and oral presentations.
7. Critically evaluate and apply advanced topics in research methodology, such as meta-analysis, longitudinal studies, and emerging trends in research methods.
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Achievement of course objectives:
In order to meet the above objectives and learning outcomes, students will be taught basic concepts of research methodology, the different types of research with emphasis on biomedical engineering, methods of formulating research questions, methods of designing a comprehensive research protocol, methods of data collection, ethical issues for data collection and the necessary approvals, methods of data analysis, writing research proposals, writing research papers, and the relevant research methods. Students will be required to conduct a small-scale research protocol that includes data collection, data analysis, writing a scientific paper, and presenting the results to an audience.

BMET103 Biology-Biotechnology

Course Coordinator:
Professor E. Pantatosaki, University of West Attica, Greece

Co-teachers:
Dr. G. Panayotou, Resercher A', BSRC Alexander Fleming, Greece
Dr. D. Thomaidou, Researcher A', Hellenic Pasteur Institute, Greece

Course Objectives:
The purpose of the course is the study of basic knowledge in biology and its applications in the developing field biotechnology. In particular, basic biological principles and concepts will be analyzed such as the structure and function of biomolecules, biological membranes, the flow of information and energy in the cell as well as basic knowledge about the function of genes and viruses. Presentation of basic biotechnologies such as molecular cloning, PCR transgenic and knock out models. Additionally, presentation of cutting-edge biotechnologies such as multiphoton imaging, stem cell biology and molecular proteomic analysis and the application of the above in the diagnosis and possible therapy of various diseases.

Learning Outcomes:

1. Knowledge of the basic concepts of biology and introduction to the scientific field of biotechnology.
2. Understanding the possibility of exploiting and connecting biological knowledge with biotechnological applications.
3. Understanding the utility of the application of various biotechnologies for the clinical study, treatment and therapy of various human diseases.
4. Ability to evaluate the results of biotechnological applications for the analysis, diagnosis and treatment of various diseases.

Achievement of course objectives:
The achievement of the above is achieved through lectures during which students actively participate with questions leading to discussions, resulting in a better understanding and familiarization of basic biological knowledge and the possibility of its utilization and application in the field of biotechnology. In order for students to develop critical thinking skills, as well as the ability to evaluate major achievements in biotechnology, they are assigned to organize and prepare as well as orally present individual papers on cutting-edge biotechnology topics. Finally, in order for the students to gain a first experience and "insight" into the complexity and intricacy of the acquisition of knowledge in biological topics and the application of this knowledge in the field of biotechnology, a visit to a research institute is carried out where students have the opportunity to see a state-of-the-art biorefinement unit. The unit is equipped with three confocal microscopes, one of which also functions as a multiphoton microscope and a high-tech "time lapse" wide-field microscope with the possibility of video imaging of living cells. Also during the visit, a presentation of a cell culture and tissue culture room with its instruments such as a filament flow focus, photon microscope, mini cell centrifuge, etc.

BMET104 The biomedical engineering industry sector I

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
Associate Prof. P. Liaparinos, University of West Attica, Greece

Associate Prof. S. Kostopoulos, University of West Attica, Greece
Assistant Prof. E. Athanasiadis, University of West Attica, Greece
Assistant Prof. E. David, University of West Attica, Greece
Dr. G. Loundos, CEO BIOEMTECH, Greece
Invited experts

Course Objectives:
Invited experts from the industry sector will deliver specialized seminars regarding the real-world conditions, outlook and prospects of the biomedical engineering profession.

Learning Outcomes:
1. Comprehensive understanding of the roles of biomedical engineering in the labor market, distinguish different career paths and prospects.
2. Recognize the interdisciplinary nature of biomedical engineering and its integration with medicine and technology.
3. Critical evaluation of industry trends and challenges.

Achievement of course objectives:
To fulfil the above objectives and learning outcomes, invited experts from the biomedical sector will deliver specialised seminars that will discuss, analyse and develop issues related to maintenance, calibration, repair, installation and quality control of biomedical equipment, sales, promotion and marketing of biomedical products, the fields of special applications, clinical and hospital engineering, biomedical engineering research, biomedical engineering education and certification, career prospects in biomedical engineering, patenting and design of new biomedical engineering products, development of start-up companies.

BMET105 Biostatistics

Course Coordinator:
Assistant Prof. S. Kostopoulos, University of West Attica, Greece

Co-teachers:
Assistant Prof. E. Athanasiadis, University of West Attica, Greece

Course Objectives:
The aim of the course is to understand the basic concepts of statistical science and their application in health sciences research. The goal is to enable students to assimilate the material taught and to use their knowledge both in their professional field and in broader applications of biostatistics and probability, which are essential in the context of the study of biomedical engineering problems. Students will apply their knowledge to real biostatistics problems, analyzing data with modern biostatistics tools and evaluating the findings.

Learning Outcomes:
The course outcomes aim to provide students with a foundational understanding of statistical concepts and methods. These outcomes are designed to equip students with the necessary skills to analyze and interpret data, make informed decisions, and apply statistical techniques.

1. Develop a solid understanding of fundamental statistical concepts, including probability, hypothesis testing, confidence intervals, and basic descriptive statistics.
2. Learn to summarize and present data effectively using descriptive statistics, such as measures of central tendency, variability, and graphical representations.
3. Understand the principles of inferential statistics, including hypothesis testing, p-values, and the interpretation of statistical significance.
4. Explore common probability distributions, including the normal distribution, binomial distribution, and Poisson distribution.
5. Gain hands-on experience with statistical software tools commonly used in the field, such as R.
6. Develop critical thinking skills to analyze real-world problems and apply appropriate statistical methods to solve them.
7. Learn to create effective data visualizations to communicate statistical findings, using charts, graphs, and other graphical representations.
8. Develop the ability to communicate statistical results clearly and concisely, both in written reports and oral presentations.
9. Familiarity with common statistical tests, such as t-tests, chi-square tests, and ANOVA, and an understanding of when to apply them.
10. Gain experience in conducting small independent research projects, applying statistical methods to analyze data and draw conclusions.

Achievement of course objectives:
Achieving the above objectives requires a combination of active participation, effective study strategies and practical application of statistical concepts.
- Students will actively participate in class discussions, ask questions and seek clarification when needed. Active participation helps to enhance understanding and retention of statistical concepts.
- Students should attend class consistently to stay on track with the course material. Skipping classes can lead to gaps in understanding, especially as concepts develop on top of each other.
- Since mathematics and statistics are skills that improve with practice, regular work on the problems and exercises provided in the course materials will reinforce theoretical concepts.
- Students will benefit from additional resources and supplemental essays.
- Students will gain hands-on experience with statistical software tools and practice using tools such as R to analyze data and perform statistical tests. From the practical experience they will be required to create a project and submit a report in the form of a scientific paper. They will also have to prepare a corresponding presentation in front of their peers, where they will have to explain statistical concepts to others, a process that can enhance their own understanding.

BMET106 Medical Signal and Image Processing

Course Coordinator:
Prof. Emeritus D. Cavouras, University of West Attica, Greece

Co-teachers:
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Course Objectives:
The aim of the course is to study the methodologies used in the creation, acquisition and processing of medical signals and medical images resulting from various medical signal generation systems (e.g. cardiogram, myogram, encephalogram) and images (e.g. digital images of MRI, CT, ultrasound, digital angiography, mammography, nuclear medicine, microscopy). Methods of data formation and storage (signals and images), methods of data imaging, as well as methods of data processing will be analysed. Data processing and analysis algorithms will be developed in theory and implemented in programming language. Students will be trained to design and implement in software integrated systems for acquisition, storage, processing, and analysis of medical signals and images using modern software libraries.

Learning Outcomes:
After the end of the course students:
1. Will know the theory and implementation technologies of methodologies related to the acquisition, imaging, processing and analysis of medical signals and images,
2. Will understand the methods used in modern computing systems of medical systems and images,
3. Will be able to distinguish and understand the processing and analysis methods required in the different cases of medical systems,
4. Be able to implement digital signal and image processing algorithms in programming language code and to implement in programming language, using modern software technologies, integrated medical signal and image processing and analysis systems.

Achievement of course objectives:
To achieve the above objectives, a comprehensive introduction to programming for the acquisition and display of medical data (signals and images) will be provided. Subsequently, the methods of data processing and analysis will be analysed with their modern implementation in a programming language, also making use of functions from relevant open source software libraries. More in-depth evaluation of the functionality and suitability in medical applications will be achieved by designing and implementing systems, in the form of group work, to solve specific issues related to medical signals or images.

BMET107 Biomedical Marketing

Course Coordinator:
Associate Prof. P. Zoumpoulakis, University of West Attica, Greece

Co-teachers:
G. Troulis, CEO, TTMI, Greece

Course Objectives:
The purpose of this course is to provide students with a comprehensive understanding of the fundamentals of marketing, focusing particularly on their application to the biomedical field. Through examination of the various aspects of market research, innovation, technology transfer, and marketing plan development, students are expected to gain specific knowledge that will enable them to operate successfully in the modern biomedical sector.

Learning Outcomes:
By the end of this course, students should be able to:
1. Understand the basic concepts and principles of marketing and their application in the biomedical sector,
2. Apply market research methods, including secondary source analysis, to make marketing decisions,
3. Understand the process of creating and developing biomedical products and services,
4. Judge the importance of innovation in the biomedical industry and its application to marketing strategies,
5. Understand the role of technology transfer as a key component of technology marketing,
6. Understand the life cycle of a biomedical product or service and the challenges it faces during its life cycle,
7. Identify the characteristics of biomedical markets, including size, sectors, and barriers,
8. Develop a marketing plan for biomedical products or services,
9. Understand the importance and strategies of digital marketing in the biomedical sector.

Achievement of course objectives:
To achieve the above, the course will provide students with a systematic introduction to the basic concepts of marketing, with emphasis on the biomedical sector, through lectures, examples and discussions. Lectures will incorporate discussions and seminars with industry professionals.

BMET108 Quality Assurance and Medical Device Regulations

Course Coordinator:
Prof. I. Valais, University of West Attica, Greece

Co-teachers:
Prof. G. Fountos, University of West Attica, Greece
Assistant Prof. Ch. Michail, University of West Attica, Greece

Course Objectives:
The primary aim of this course is to explore the concept of quality assurance in Medical Devices (MD), and the jurisprudential and regulatory framework that regulates the Delivery, Maintenance and disposal of Medical Devices within the European Community (EC) and internationally. The concepts of Quality Control and Quality Assurance will be analyzed, as well as how to compose, establish and perform quality control procedures. The course will cover Basic Quality Control Procedures for patient and user safety as well as specialized knowledge on the principles of Radiation Protection from Ionizing and non-ionizing radiation. Additionally, Radiation Protection Protocols used in X-ray and Nuclear Medicine Departments will be analyzed. The key-point parameters in Total Quality Management Systems in conjunction with the integration of quality control procedures in these systems will be analyzed. Students will learn and emphasize in the design of quality control protocols and they will study cases of implementation and integration of these protocols into a Quality Management System. They will become familiar with the application of medical image quality control software using digital models and evaluate methods for the improvement of medical image quality.

Learning Outcomes:
1. Acquire fundamental knowledge regarding the European Regulations and the European Directives for the Manufacture, Management and Disposal of Medical Devices,
2. Acquiring knowledge of Greek and International legislation regarding Radiation Protection and Quality Control of Medical Equipment that use radiation
3. Evaluation of the effects of radiation (ionizing and non-ionizing) on humans based on radiation characteristics (intensity, frequency, energy, etc.) and awareness of the factors that influence the reduction of radiation exposure of examinees, patients and staff in order to choose the appropriate prevention and protection, from radiation, methods Analysis of serious incidents and field safety corrective actions (FSCA) in Hospital environment for Medical Devices using ionizing and non-ionizing radiation and Radiation Protection (RP) methods
4. Distinguish and differentiate between standards and quality assurance systems applied to Medical Devices
5. Understanding of the importance of assessing the Conformity of existing and innovative medical devices (CE marking) and the obligations arising from it and the good administrative practice between Manufacturers, Users-Operators and Notified Bodies,
6. Theoretical and experimental application of medical image quality controls using digital phantoms
7. Understanding of the established principles regarding risk assessment and risk management, vigilance data and complaints Understanding the classification and categorization of medical devices and methods of reporting serious adverse events or incidents to notified bodies and parties engaged.

Achievement of course objectives:
To achieve the above, students will first be taught basic concepts of quality standards, quality control and quality assurance of Medical Devices. The differentiation between

quality controls and safety controls will be analysed as well as their suggested frequency of application. In particular, the working principle of some of the basic instruments used for radiation detection and the measurement methodology will be analysed. Reference will be made to the main sources of radioactive waste and their management methods as well as to the Greek and international legislation on radiation protection (Radiation Protection Law). Afterwards, quality control of images of medical imaging systems will be performed using the RAD_IQ software developed by collaborators and members of the institutionalized Laboratory of Radiation Physics, Materials Technology and Biomedical Imaging, AKTYVA (Director Prof. G. Fountos) (Foundation decision. The next section of the course is the introduction to the existing quality management systems, the procedures of their implementation and realization, as well as ways to systematically record the organization of measurements and measuring devices. Finally, in the form of group work, there will be a study of the European Regulations and Directives governing Medical Devices and the procedures linking the Manufacturer, the User and the Regulatory Agency.

BMET109 Biomechanics and Biomaterials

Course Coordinator:
Dr. I. Loukos, EKAB, Greece

Co-teachers:
Assistant Prof. A. Besinis, University of Plymouth, UK
Assistant Prof. E. Pantatosaki, University of West Attica, Greece

Course Objectives:
The aim of the course is to understand the basic principles of biomechanics, focusing on the field of rehabilitation through prosthetic and orthotic systems of the human body, especially for the upper and lower limbs using robotic systems and the concept of human performance. Also, after defining the concept of biomaterials, all their types and basic applications and their microscopic structure will be presented. Applications in molecular simulation of biomaterials will be mentioned and the basic concepts of the use of supercomputers in biomaterials research, advanced multi-purpose biomaterials and their use in targeted cancer therapies will be discussed. The basic parts of tissue engineering systems will be analysed and the types of materials used will be presented. In this context, modern applications in the field of nano-materials in medicine and dentistry, antibacterial coatings on medical and dental implants will be presented. Finally, the basic concepts of regenerative medicine and its connection with tissue engineering will be presented.

Learning Outcomes:
1. Comprehensive understanding of the scientific field of biomechanics and biomaterials, including tissue engineering, knowledge of definitions and key concepts.
2. Description and discrimination of the used prosthetic and orthotic systems, quantitative and qualitative analysis of human performance.
3. Understanding basic principles of robotics and interface between brain and prosthetic body parts.

4. Understanding of the types of biomaterials and ability to distinguish and compare between them.
5. Distinguish and evaluate specific characteristics by type of biomaterials.
6. Understanding basic principles of nanomaterials and their applications in medicine and dentistry as coating materials and antibacterial protection of implants.
7. Understanding of new technologies in targeted cancer therapies and regenerative medicine, using multi-purpose biomaterials.

Achievement of course objectives:
To achieve the above, students will first be taught basic concepts of biomechanics and biomaterials. Then, the applications of biomechanics in the assessment of human performance and rehabilitation (prosthetic/orthotic) of mainly the upper and lower limbs of the human body will be analyzed. In addition, all types of biomaterials and their applications will be analysed over time. In this way, students will be able to distinguish the types of biomaterials from each other, as well as to compare their potential depending on the application. Students will now have the knowledge to be able to define criteria and conditions to assess the suitability and overall compatibility of biomaterials. The basic principles of robotic rehabilitation, which now incorporates the interface between the brain and the artificial parts of the human body, and tissue engineering and its interface with regenerative medicine will then be presented.

The last modules of the course include all the cutting-edge technologies in the field of biomaterials, focusing on their application in dentistry and the coating of implants with provision for their antibacterial protection using nanomaterials. Multi-application nanomaterials will be understood to have applications in cancer therapies, development of advanced vaccines and regenerative medicine.

BMET1010 Optical Microscopy

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
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Course Objectives:
This course provides a comprehensive introduction to optical microscopy, covering fundamental concepts, historical developments, and the essential technologies and components of optical microscopes. It extends to the physics of light, the interaction of light with matter, and the function of the human visual system. The course discusses the fundamental optical elements and concepts crucial for microscopy, including lenses, filters, magnification, focus, diffraction, and resolution. Students will gain insights into various types of optical microscopes and their components, with a focus on practical applications in medicine and biology. Additionally, the course addresses advanced topics in digital image processing and analysis tailored for microscopy images.

Learning Outcomes:
By the end of this course, students should be able to:
1. Demonstrate a solid understanding of the fundamental concepts of optical microscopy,
2. Understand the physics of light, the human visual system and the interaction of light with matter,
3. Recognize and differentiate between various types of optical microscopes, such as bright-field, phase-contrast, dark-field, polarization, fluorescence, confocal, and super-resolution microscopes,
4. Recognize, differentiate and understand the functions of basic elements of the microscope, such as filters, prisms, diaphragms, objectives, eyepieces, condensers, lenses, microscope stage, digital detectors, and light sources,
5. Evaluate and engage in a critical analysis to differentiate the application domain in medicine and biology of each different microscopy technique,
6. Develop analytical and problem-solving skills in digital image processing and analysis, allowing for the extraction of meaningful information from microscopy images.

Achievement of course objectives:

To achieve the above, the course will provide students with a systematic introduction to the basic concepts of optical microscopy, demonstration and experimentation of optical microscopes with real medical data.

BMET201 Diagnostic Medical Imaging Systems

Course Coordinator:
Assistant Prof. E. David, University of West Attica, Greece

Co-teachers:
Assistant Prof. C. Arvanitis, Georgia Institute of Technology, USA
Prof. G. Foundos, University of West Attica, Greece
Associate Prof. P. Liaparinos, University of West Attica, Greece
Prof. Emeritus I. Kandarakis, University of West Attica, Greece

Course Objectives:
The purpose of this course is to study the basic structure of diagnostic medical imaging systems that use non-ionizing and ionizing radiation. The basic parts (block diagrams) of various diagnostic imaging systems such as Ultrasound and Magnetic Resonance Imaging (MRI) scanners as well as the general radiology (Diagnostic x-ray, Mammography and Computed Tomography-CT) and Nuclear Medical Imaging (γ-camera, SPECT and PET) systems will be analyzed.

In addition, specialized knowledge related to:

-physical principles of ultrasound generation and propagation
-physical principles of magnetic resonance, superconductivity

-Interactions of high energy photons (X-rays and γ-rays) and high-energy particles with matter.
-Interactions of x-ray production and methods of radioisotope production
-types of radioactivity and radiation attenuation through tissues and detectors
-imaging techniques for energy integration detectors (used in x-ray detectors)
-photon counting imaging techniques (used in nuclear imaging, γ-ray detectors) will be provided.

The course includes a laboratory exercise in photon-gamma spectroscopy with a sodium iodide detector NaI:Tl and individual projects and oral presentations on modern and combined medical imaging methods.

Learning Outcomes:
Students will be able to distinguish and compare different methods of various diagnostic Medical Imaging systems, to understand the basic principles of their operation and to evaluate imaging systems knowing the spatial resolution limit of them.

Upon completion of the course, students will have:

1. Deep knowledge of the basic principles of physics regarding ultrasound, magnetic resonance, photon interactions (X-ray and gamma-ray) with matter and high-energy particle interactions with matter.
2. A comprehensive understanding of the scientific field of ionizing and non-ionizing radiation diagnostic medical imaging systems.
3. The ability to describe and distinguish all the individual parts (block diagrams) of described diagnostic medical imaging system.
4. Understand in a deep way the operational principles of each imaging system in order to be able to make a comparative evaluation among them.
5. In addition, students will have developed research abilities and collaborative activities through of a literature/review study and oral presentations, and experimental skills in γ-photon spectroscopy calibration of a sodium iodide (NaI:Tl) scintillator detector.

Achievement of course objectives:
To achieve the above, students will first be taught the basic physical concepts used in non-ionizing radiation diagnostic imaging systems such as Ultrasound and Magnetic Resonance Imaging (MRI) systems. The basic parts that make up these systems will be analysed and emphasis will be placed on understanding the common and individual parts that make up a diagnostic imaging system.
Next, the diagnostic systems of ionizing radiation will be analyzed, with emphasis on the techniques applied for anatomical/morphological imaging in Classical Radiation Diagnostics, as well as on the imaging techniques used in Nuclear Medical Imaging to monitor the functionality of organs. Special emphasis will be given to the detectors used:
-Energy integration imaging techniques (x-ray detectors); and photon-counting imaging techniques (nuclear imaging detectors, gamma-ray detectors)

Finally, the course will include an experimental laboratory exercise with a sodium iodide detector NaI:Tl and radioactive isotopes in order to calibrate the detector by the students and to answer questions on photon-g spectroscopy.

BMET202 Biomedical Instrumentation

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
Prof. P-K. Kock, Hochschule Trier, Germany
Prof. E. Ventouras, University of West Attica, Greece

Course Objectives:
The primary aim of this course is to explore the fundamental structure of selected biomedical systems, particularly biosignal recording systems. A detailed analysis will be conducted on the constituent components of an integrated digital biomedical system, elucidating how each element contributes to the overall functionality of the system. The course will cover essential principles, including measurement sensors, preamplification, amplification, analog signal modulation, signal processing circuits, digitization circuits, digital signal modulation and processing using microcontrollers and microprocessors, and user interface modes. Students will gain theoretical insights into designing an integrated digital biomedical system for biosignal recording (e.g., temperature, pressure, heart rate), acquire practical skills in constructing and implementing such systems in a laboratory setting, learn to apply the systems for recording measurements, and develop proficiency in analyzing the obtained data. Additionally, the course will delve into the foundational aspects of neuroengineering and implants.

Learning Outcomes:
1. Gain a comprehensive understanding of biomedical instrumentation, encompassing neuroengineering and implants, with knowledge of key definitions and concepts.
2. Describe and differentiate the individual components constituting an integrated biomedical biosignal recording system.
3. Comprehend the operational principles and conduct a comparative evaluation of various biosignal recording systems, such as electrocardiographers, electroencephalographers, and electromyographers.
4. Understand, investigate and experimentally assess the reliability of biomedical systems.
5. Theoretically design and experimentally implement an integrated digital biosignal recording system using microcontrollers and microprocessors.
6. Acquire knowledge of the fundamental principles of biosensor circuit implementation, preamplification, amplification, filtering, digitization, and software implementation for programming microcontrollers and microprocessors.

Achievement of course objectives:
To achieve the above, students will first be taught basic concepts of sensors, analog and digital modulation of signals, and methods of displaying measurements in a form understandable by the end user. Then, the individual components that make up a biomedical biosignal extraction system, such as the electrocardiograph, will be analyzed. Subsequently, a biosignal extraction system will be implemented in the laboratory, where microcontroller and microprocessor programming concepts and implementation of preamplification, amplification and filtering circuits will be taught, with emphasis on the specific specifications of these circuits for biomedical applications. After the end of the workshop all students will be able to design theoretically, implement experimentally and understand substantially all the individual parts that make up a biosignal extraction system. The experimental implementation includes collaborative activities between students, and all students will be required to deliver an individual project on the theoretical design of a biosignal extraction system similar to the one they will implement in the lab.
The final module of the course includes advanced topics in biomedical instrumentation with emphasis on neuroengineering and implants, fields for which the basic principles and current developments will be analysed.

BMET203 The biomedical engineering industry sector II

Course Coordinator:
Prof. D. Glotsos, University of West Attica, Greece

Co-teachers:
Associate Prof. P. Liaparinos, University of West Attica, Greece
Associate Prof. S. Kostopoulos, University of West Attica, Greece
Assistant Prof. E. Athanasiadis, University of West Attica, Greece
Assistant Prof. E. David, University of West Attica, Greece
Invite Experts from the field of Biomedical Engineering

Course Objectives:
Invited experts from the industry sector will deliver specialized seminars regarding the real-world conditions, outlook and prospects of the biomedical engineering profession, with emphasis in how to build a start-up company from a scratch.

Learning Outcomes:
1. Comprehensive understanding of the roles of biomedical engineering in the labor market, distinguish different career paths and prospects.
2. Recognize the interdisciplinary nature of biomedical engineering and its integration with medicine and technology.
3. Critical evaluation of industry trends and challenges.

Achievement of course objectives:
To fulfil the above objectives and learning outcomes, invited experts from the biomedical sector will deliver specialised seminars that will discuss, analyse and develop issues related to maintenance, calibration, repair, installation and quality

control of biomedical equipment, sales, promotion and marketing of biomedical products, the fields of special applications, clinical and hospital engineering, biomedical engineering research, biomedical engineering education and certification, career prospects in biomedical engineering, patenting and design of new biomedical engineering products, development of start-up companies.
At the end of the course, participants will take up the challenge to develop and refine their individual ideas in the context of a start-up company. This process will involve collaborative participation in a team project, providing students with the opportunity to apply the knowledge and skills acquired during the course. The aim of the group project is to design a start-up in the field of biomedical engineering from scratch.

BMET204 Emergency medicine

Course Coordinator:
Dr. I. Loukos, EKAB, Greece

Co-teachers:
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Course Objectives:
The aim of the course is to provide an understanding of the basic principles of emergency medicine as well as the means of patient transport and medical equipment used. This equipment, although it is part of the general medical equipment used in the health sector, due to the conditions prevailing during emergency medical and rescue assistance to the patient, is accompanied by certifications against demanding and strict standards of quality and efficiency. The presentation of these, and the safety rules that accompany them, will enable students to study the most stringent framework for the operation of medical devices.

Learning Outcomes:
1. Comprehensive understanding of the scientific field of emergency medicine and the medical equipment that surrounds it, with a clear distinction between patient vital signs support equipment, patient transport and patient extrication.
2. A clear distinction between patient vital signs support equipment, patient transport and patient extrication.
3. Knowledge of the terms of European quality and efficiency standards relating to emergency medicine, staff and patient safety and the medical equipment used.
4. Discrimination and ability of students to describe the means of transport and evacuation used in emergency medicine and relating to life support, transport and extrication of the patient.
5. Knowledge of the key points of sanitary evacuation - MEDEVAC under extreme conditions, after presenting the available and used means of extrication and stabilization of the patient with the help of medical equipment.

Achievement of course objectives:
After the presentation of the basic principles of emergency medicine in the light of the medical equipment used, students will be able to distinguish the types of this

equipment according to their characteristics, capabilities and use. The presentation of the strict rules of quality and safety standards will enable students to evaluate the reliability of the equipment's operation after having fully understood the basic principles of its operation.
In addition, students will be able to distinguish between means of evacuation and transport of patients on the basis of their specific characteristics and the capabilities they provide to medical and rescue personnel. Knowledge of the characteristics of the ground, air and waterborne means of transport used will enable students to discern the need to improve and strengthen some of them. Finally, the presentation of the principles of sanitary evacuation - MEDEVAC, will enable the students to become familiar with the specific subject of evacuation and transport of the patient from fields characterised by extreme conditions.

BMET205 Control systems in biomedical engineering

Course Coordinator:
Associate Prof. I. Tache, Politehnica University of Bucharest, Romania

Co-teachers:
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Course Objectives:
The course will assist students towards understanding the fundamentals of control systems, acquire the skills to mathematically model biophysical systems, translating real-world phenomena into mathematical equations for analysis and control system design, explore and comprehend the application of control systems in the regulation of physiological processes within the human body, gain hands-on experience in implementing control systems through numerical control, utilizing hardware such as Arduino for practical applications.

Learning Outcomes:
By the end of this course, students should be able to:

1. Understanding of fundamental control system concepts, able to differentiate between various types of control systems and explain the importance of feedback in control processes.
2. Ability to represent complex biological processes using mathematical equations.
3. Application of control system principles to understand and analyze the regulation of physiological processes in the human body.
4. Through hands-on projects and exercises using Arduino, students will demonstrate the ability to implement numerical control systems, write code for hardware interfaces, and troubleshoot practical challenges.
5. Critically evaluation and discussion of the application of control systems in biomedical devices, understanding the role of control systems in artificial organs and medical interventions.

6. Develop problem-solving skills and critical thinking in the context of control systems, enabling students to analyze, design, and optimize control systems for various biomedical scenarios.

Achievement of course objectives:
In order to achieve the defined objectives and the described learning outcomes, students will be exposed to the fundamental concepts of control systems. Through hands-on laboratory sessions, they will engage in practical experimentation with control systems using Arduino and programming for numerical simulation of biophysical processes. The course will include the completion of a final project focusing on a real control system problem. This project will give students the opportunity to integrate all learning outcomes, promoting both integrated understanding and self-development in a real-world application context.

BMET206 Bioinformatics

Course Coordinator:
Assistant Prof. E. Athanasiadis, University of West Attica, Greece

Co-teachers:
Associate Prof. S. Kostopoulos, University of West Attica, Greece
Assistant Prof. M. Matsoukas, University of West Attica, Greece

Course Objectives:
The purpose of the bioinformatics course is to provide students with specialized knowledge and skills needed to analyse, design, and apply computational methods and techniques in the field of biology and medicine. Bioinformatics applications cover a wide range of fields, including genomic data analysis, representation and analysis of protein structures, systems biology, drug development, and other fields of biology and medicine. Students taking this course will gain specialized knowledge of the use of advanced computational methods for the processing, analysis, and interpretation of biological data. It also focuses on the development of new computational methods and tools that can help address the challenges facing biology in the era of big data.

Learning Outcomes:
After the end of the course students:
1. Will know basic concepts of bioinformatics for solving basic and translational research problems.
2. Will develop basic programming principles in the R environment.
3. Will understand and execute Big Data Analysis algorithms at a professional level, selecting correct operating parameters for these tools.
4. Will develop specialized skills in solving complex computational biology problems that can be applied in research fields of Universities, Research Centers and Bio/Pharmaceutical Companies.
5. Develop knowledge mining skills on huge databases of omics data.

Achievement of course objectives:

To achieve the above, you will provide students with a systematic introduction to the basic concepts of bioinformatics through lectures, examples and discussions. Lectures may be accompanied by exercises that apply the new knowledge. Practical exercises and workshops will be organized to reinforce programming skills in the R environment. Real biological data will be used to make the course more practical. You will provide hands-on experience in running analysis algorithms on large datasets. This can be done through laboratory exercises or programming projects that require the use of bioinformatics tools. Students will be encouraged to participate in complex research projects or simulation environments where they will develop their skills in bioinformatics problem solving. They will be trained in knowledge extraction techniques and the use of tools to retrieve information from large databases.

BMET207 Human-Machine Interaction in Healthcare

Course Coordinator:
Prof. L. Coelho, Politécnico do Porto, Portugal

Co-teachers:
Prof. L. Mourao, Politécnico do Porto, Portugal

Course Objectives:
The main objectives of the course are:

1. Describe the Principles of Human-Machine Interaction (HMI) in healthcare:
a. Define key concepts related to human-machine interaction and their application in healthcare contexts.
b. Identify and discuss the factors influencing successful HMI design in healthcare, including user needs, usability, and accessibility.

2. Describe Healthcare Technology Trends and Innovations:
a. Evaluate current trends and emerging technologies in healthcare, such as telemedicine, wearable devices, and artificial intelligence.
b. Critically assess the potential benefits and challenges associated with the adoption of new technologies in healthcare.

3. Design and Evaluate User-Centered Healthcare Interfaces:
a. Apply user-centered design principles to create healthcare interfaces that prioritize user experience and meet the needs of diverse user groups.
b. Conduct usability testing and analyze user feedback to iteratively improve healthcare interfaces.

4. Explore Ethical and Regulatory Considerations:
a. Examine ethical issues related to human-machine interaction in healthcare, including privacy, data security, and the responsible use of AI.
b. Understand the regulatory landscape governing healthcare technology and its implications for design and implementation.

5. Demonstrate Effective Communication of HMI Concepts:
a. Articulate HMI concepts, design decisions, and research findings through written reports, presentations, and interactive demonstrations.
b. Tailor communication for both technical and non-technical audiences to facilitate knowledge dissemination.

6. Apply Practical Skills in HMI Prototyping and Development:
a. Gain hands-on experience in prototyping and developing human-machine interaction solutions for healthcare applications.

Utilize relevant tools and platforms to implement and test interactive healthcare technologies.

Learning Outcomes:
By the end of this course, students should be able to:

1. Describe human-machine interaction (HMI) technologies applied to the healthcare context.
2. Propose solution for a given HMI problem while considering design requirements, technological possibilities and restriction.
3. Design evaluation scenarios for HMI technology and identify metrics for performance assessment.
4. To address ethical concerning within the HMI context as well as in application cases.

Achievement of course objectives:
To meet the above objectives and learning outcomes, students will be taught basic concepts of HMI. In the lab, students will experiment with HMI technologies and implement HMI solutions. Developing a final project focused on a real HMI problem will allow students to include all learning outcomes while promoting self-development in a real-world application scenario.
More specifically, learning outcome 1 will be supported by objectives 1 and 2, learning outcome 2 will be covered by objective 3, learning outcome 3 will be achieved by objectives 5 and 6, and learning outcome 4 will be addressed by objective 4 of the course.

BMET208 Machine Learning in Medicine and Biology

Course Coordinator:
Prof. Emeritus D.Cavouras, University of West Attica, Greece

Co-teachers:
Assistant Prof. Cr. Soguero-Ruiz, Rey Juan Carlos University, Spain

Course Objectives:
The purpose of this course is to study the methodologies used in the design of Machine Learning systems for applications in medicine and biology. The methods (a) for data acquisition and cleaning (usually files in csv, excel, json, xml, yaml formats),

(b) for generating features from medical and/or biological images of patients, (c) for statistical analysis of data will be analyzed. Supervised Machine Learning methodologies will also be analyzed in the design of machine learning algorithms in programming language, and will be used for the design of Machine Learning systems in disease discrimination and also in disease assessment. Students will also be trained in the design of unsupervised learning and deep learning systems, in a programming language using real medical or biological data and using modern software libraries.

Learning Outcomes:
After the end of the course students:
1. Will know the theory and implementation technologies of methodologies related to the application of Machine Learning in Medicine and Biology,
2. Will understand the methods used in modern computing systems where Machine Learning is applied,
3. Will be able to distinguish and understand the processing and analysis methods required in the different cases of data cleaning and analysis as well as the selection of appropriate Machine Learning algorithms,
4. Be able to apply Machine Learning algorithms, in programming language code and using modern software technologies, to integrated engineering systems in medicine and biology.

Achievement of course objectives:
To achieve the above objectives, a comprehensive introduction to programming will be provided for the acquisition, cleaning and transformation of medical data prior to its use in Machine Learning algorithms. Subsequently, Machine Learning methods will be analyzed with their modern programming language implementation, also making use of functions from relevant open source software libraries. More in-depth evaluation of the functionality and suitability in medical applications will be achieved by designing and implementing systems, in the form of group projects, for solving specific problems related to medical or biological data.

BMET209 Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics

Course Coordinator:
Dr. A. Vlantoni, NKUA, Greece

Co-teachers:
Prof. A. Tympas, NKUA, Greece
Prof. Emeritus I. Kandarakis, University of West Attica, Greece

Course Objectives:
The course analyses the critical ethical and bioethical dimensions related to the development of technology in the field of biomedical engineering. Students will explore the history of ethics and bioethics, general ethical principles and theories, and the legal frameworks that shape practice in this field.

Learning Outcomes:
After the end of the course students will be able to:
1. Understand the evolution of ethical values and challenges in the field of bioethics.
2. Recognize and apply the key ethical principles and theories underlying biomedical engineering.
3. Understand the normative frameworks that shape bioethical practice.
4. Analyze the role of government, scientific societies, education, and health care institutions in biomedical engineering ethics.
5. Recognize the ethical challenges posed by technological advances.
6. Understand the need for ethics in practice, scientific research, data mining and industry in biomedical engineering.
7. Understand the importance of ethics and code of ethics in the professional practice of biomedical engineers.

Achievement of course objectives:
To achieve these objectives, the lectures will discuss issues related to the history of ethics, the basic principles of ethics, and legal frameworks. In the lectures, students will critically discuss further case studies and ethical dilemmas in the field of biomedical engineering.

Diploma Thesis

General Description

The obligations of the students of the MSc include the preparation of an individual Diploma Thesis, under the supervision of the teaching staff and on topics related to the subject of the MSc program. Briefly, during the preparation of the Diploma Thesis the student performs a review of the basic literature and recent literature references on the topic of the thesis, carries out a theoretical, constructive, computational or experimental approach to the topic of the thesis and deepens the corresponding scientific field in collaboration with the supervising professor, extracts the results of the study and records the conclusions drawn from them in combination with the relevant work of previous researchers and finally consolidates all the above in the text of the thesis, which is structured in the form and according to the standards of scientific papers.

More specifically, the Diploma Thesis constitutes an independent scientific and systematic approach to the analysis of a topic, which is based on existing literature and research. At the same time, the student makes use of the knowledge and skills acquired during his/her studies.

Through the Diploma Thesis, the student, under the guidance of the supervisor, is required to develop the skills of critical and combined thinking, organization and analysis for the in-depth investigation of a distinct topic of specialization of interest to him/her, applying a rigorous, systematic and scientific approach. In this sense, the preparation of the Diploma Thesis is considered of key importance and through it the final year student is provided with the opportunity to synthesize and utilize, both in

theoretical and experimental fields, the knowledge acquired during his/her studies, in order to promote scientific thinking and research.

In terms of its subject matter, a Diploma Thesis can, indicatively, be:

- Research - theoretical, when it concerns the development of a new theoretical model or the extension of an existing one and its application to problem solving.

- Research - developmental in which an experimental setup or assembly is designed and/or constructed, experimental measurements are performed and/or processed, a computational methodology or an algorithmic scheme is developed.

- Empirical investigation of a problem by collecting, processing, analysing and documenting data.

- Study of a question of technological interest which is investigated analytically or computationally in the light of the research approach.

- Independent literature synthesis of a topic with description, inventory of existing knowledge and documented critique.

Assignment of Diploma Thesis

- The student, after consultation with the proposed supervisor, submits an application for a Thesis topic to the Secretariat of the MSc, for approval by the Assembly of the Department. The application is countersigned by the supervisor. The application period is set for one (1) week after the end of the period of online course registration, at the beginning of each semester.
- Before starting the thesis, the student in collaboration with the supervisor must ensure compliance with the Code of Ethics of the University of West Attica, if required (see the website of the UNIWA Research Ethics Committee). In most cases, this compliance concerns the use of data obtained from human beings.
- In order to be assigned a thesis, the student must be in the 3rd semester of study.
- The typical time to complete the thesis is one academic semester. The completion time may be extended by one semester with the agreement of the supervising professor.
- In exceptional cases and at the justified request of the student, the time for completion of the thesis may be extended for a further semester.
- The student may apply to the Departmental Assembly for a change of topic or supervisor at most once.

Procedure for submitting an application for the defense/examination of a Diploma Thesis

- The examination of Diploma Theses takes place exclusively after the end of each semester, or after the end of the September re-examinations within a period of two (2) weeks. In exceptional cases and following a justified request

by the student, the presentation of the thesis may take place on different dates.

- Diploma Thesis must be checked for plagiarism under the responsibility of the supervising professor through the means of TurnitIn software available to the University to detect and capture the rate of matching academic papers with the content of other sources from its database. The check through the special software must have preceded the examination of the work. This check results in an authenticity report in which the matching percentage is indicated. The final judgement regarding the evaluation of the report is made by the supervisor. If the authenticity and originality of the work is verified through this process, the procedure for submitting an examination request can be followed as explained immediately below.
- The student, after consultation with the supervising professor and if the supervising professor deems that the Thesis is sufficient, submits a request for the examination of the Thesis to the Secretariat of the MSc, which is signed by the supervising professor, until one (1) week before the beginning of the two (2) week period of the examination of the Thesis.
- The supervisor also recommends the examination of the Thesis and proposes the members of the Examination Committee for the approval of the Thesis, one of the members of which is the supervisor. Members of the Examination Committee may be members of the Faculty, or members of other categories of teaching staff in accordance with the legislation in force, or researchers from other Departments or Research Centres of the same or related subject matter to the subject of the thesis to be carried out.
- The student is responsible for submitting a copy of the Thesis in electronic form for the examination committee and for the Secretariat of the MSc.

At least one (1) week before the beginning of the above period of two (2) weeks for the examination of Diploma Theses, based on the previous applications of the students for the examination of their Diploma Thesis, the Secretariat of the MSc must draw up an examination schedule, which must be sent to the interested students, the supervisors and announced through the web pages of the MSc and posted on the notice board of the Secretariat of the MSc.

Evaluation of Diploma Thesis

The members of the Examination Committee evaluate the Diploma Thesis presentation and pose questions to form an assessment regarding the accuracy and comprehensiveness of the approach followed and the solution provided for the problem addressed. The grade for the Diploma Thesis is determined by averaging the scores assigned by the three members of the Examination Committee. The supervising professor submits the examination report, including the scores given by the committee members, to the MSc program Secretariat.

The examination encompasses an evaluation of the deliverable of the Diploma Thesis, as well as its presentation and defense, regarding the following indicative aspects:

• Research question and objectives (10%). Comprehension of the scientific topic investigated, originality and contribution.
Literature survey (10%). Thorough review of the relevant literature.
• Methodology (20%). Organization and planning of the necessary steps for completing the Diploma Thesis.
• Results (20%). Soundness, clarity and reliability of results.
Discussion (20%). Analysis and interpretation of the results, and formulation of corresponding conclusions.
• Writing and Presentation (20%). Organization, quality, readability and clarity, formatting and citation.

If a Diploma Thesis is deemed incomplete, it is returned to the student for further revision. In such cases, the presentation re-occurs on a date determined by the three-member Examination Committee, following consultation with the student. In such cases, the examination process is repeated as described in the aforementioned paragraphs.

Should the scientific outcomes of the Diploma Thesis be subject to patenting, the applicable Greek legislation governs the rights of the individuals holding such rights.

Posting to the Institutional Repository "Polynoi"

Once completed, the theses must be posted on the University's posting repository "Polynoi" of the University of West Attica.

The submission of the digital form of the Diploma Thesis is mandatory for the receipt of the Diploma by the students and is carried out exclusively through self-archiving by the students themselves.

In order to be uploaded to the Institutional Repository "Polynoi", the work must::

- be checked for plagiarism under the responsibility of the supervising professor through the special software available at the University,
- have the digital signatures of the supervising professor and the members of the Examination Committee,
- be in ".pdf" format,
- be embedded in the main body of the paper (on the initial pages):
    - the cover page(s) of the paper (title page),
    - on the next page the names of the Examination Committee with their digital signatures; and
    - followed by the relevant signed author's statement.

The text of the Policies of I.A. "Polynoi" and the Deposit Instructions can be found at https://www.uniwa.gr/idrymatiko-apothetirio-polynoi/

Erasmus+ Program

The Erasmus+ is the European Union's Education, Training, Youth and Sport programme for the years 2021-2027, which, among other things, enables higher education students and teachers to spend part of their course in a different country.

he MSc participates in the following ERASMUS+ actions:

- **Undergraduate Studies - Classical Mobility (Erasmus+ Studies)**
  Attendance of undergraduate courses at a European higher education institution, with the corresponding credits ECTS.

- **Intership (Erasmus+ Places)**
  The Erasmus+ Places (or Placement) action of the Erasmus+ programme allows students to carry out their Traineeships in EU countries.

- **Teaching Staff Teaching (Erasmus+ Teaching Staff Assignments)**
  The Erasmus+ programme allows members of the teaching staff to travel to and from the institutions with which agreements have been concluded, in order to give lectures for the benefit of students who are unable to travel through Erasmus+ Studies.

- **Teaching Staff Training Erasmus+**
  The Erasmus+ programme enables the mobility of teaching staff to and from the institutions with which agreements have been concluded, in order to train them through the transfer of knowledge, know-how, experience and good practice, in order to acquire practical skills for their current work and professional development.

Cooperating academic institutions

The Department and the MSc have concluded agreements with the following academic institutions of the EU for the exchange of postgraduate students and teaching staff:

1. **Universidad Politecnica De Madrid, Madrid, Spain**
   Home
   Erasmus+

2. **Universidad Rey Juan Carlos, Madrid, Spain**
   Home
   International Office

3. **Polytechnic Institute of Porto (IPP), Porto, Portugal**
   Porto School of Engineering
   Biomedical Engineering
   International Office

4. **Polytech Lyon (part of Claude Bernard University Lyon 1) - Lyon, France**
   Home

Department of Biomedical Engineering
International Office

5. **Universita Politecnica delle Marche - Ancona, Italy**
   Home
   Faculty of Engineering
   International relations office

6. **Graz University of Technology, Graz, Austria**
   Home
   International Relations
   Student preparation
   Courses
   Biomedical Engineering course

7. **Trier University of Applied Sciences, Trier, Germany**
   Home
   Medical Engineering και Medical Informatics programs
   International Office

8. **University Politehnica of Bucharest, Romania**
   Home
   Faculty of Automatic Control and Computer Science

Information for students

Students are informed electronically, through emails sent to all students, as well as through the respective websites:

- https://www.uniwa.gr : From the website of the University of West Attica, for announcements concerning the whole University.
- https://bme.uniwa.gr : From the website of the Department of Biomedical Engineering, for announcements concerning the Department.
- https://bmet.uniwa.gr : From the website of the MSc "Biomedical Engineering and Technology", for announcements concerning the MSc.
- https://eclass.uniwa.gr και https://moodle.uniwa.gr/ : From the eClass and Moodle platforms for course-related announcements.
- he University also operates the news portal University Dialogues with articles and news from the University, society and the world.

Electronic services for students

A range of online services and software are freely available to students upon enrolment at the University:

- Electronic Mail:
  https://webmail.uniwa.gr

- Asynchronous learning platforms:
  https://eclass.uniwa.gr
  https://moodle.uniwa.gr/
- The Microsoft Teams modern communication platform:
  https://teams.microsoft.com/
- Microsoft Office 365 online office applications and OneDrive space
  https://www.office.com/?auth=2
- MATLAB Application
  https://www.uniwa.gr/software/matlab/
- SPSS Application for statistics
  https://www.uniwa.gr/software/spss/
- Webcasting from some halls and auditoriums:
  https://www.uniwa.gr/webcast/
- Virtual Private Network (VPN) service, for browsing the Internet from outside the University via the University network

Benefits for students

Students of the University of West Attica enjoy a range of benefits.

Academic ID card

All undergraduate, postgraduate and doctoral students of the country's universities can apply online for a new academic identity card at the special service of the Ministry of Education with the technical support of the National Network of Infrastructures for Technology and Research (NNITR).

Libraries

The central libraries of both the Egaleo Campus and the Ancient Elaionas Campus and the Athens Campus are available to students.

The libraries have the necessary qualified staff as well as the appropriate infrastructure to serve students. The libraries' web hub provides details of all the services offered and gives access to computerised catalogues, electronic resources, electronic journals, etc.

Catering - University Restaurants

Students are provided with free meals upon presentation of their academic ID in any of the University's restaurants, after registering at the University dedicated Catering platform.

The student restaurants provide breakfast, lunch and dinner and are open daily, weekends and holidays from 1 September to 30 June each academic year, except for the Christmas and Easter holidays.

Students who are not entitled to free meals have the possibility to be fed in student restaurants, by paying a low daily fee for a full menu (lunch and dinner).

Accommodation - Student residences

The University of West Attica provides housing to eligible students. More Details f or the application procedure, as well as the necessary documents are provided at the beginning of each academic year by the Directorate of Student Affairs.

Sports - Gyms

The University of West Attica has two gyms, one at the Egaleo Grove Campus and the other at the Ancient Eleonas Campus, where students and staff of the University can exercise every day except Saturdays and Sundays. The gyms are fully equipped with fitness equipment, while the staff of the gyms guides and supervises every interested visitor.

For the coordination of all the sports activities implemented in our institution, the Department of Sports was established, which organizes a variety of group sports programs, as well as interdepartmental internal championships (basketball, volleyball, football, chess, table tennis, etc.).

Health care - Treatment

In addition to the full medical and hospital care that students are entitled to in the National Health System (NHS) with coverage of the relevant costs by the National Organization for the Provision of Health Services (EOPYY) through the use of their AMKA, in order to provide more effective primary medical care to both students and staff, the University of West Attica has medical clinics located on the campuses.

In addition, specialized clinics operate in collaboration with faculty members who are members of the University's School of Health Sciences. Indicatively:

Gynaecological Clinic: As part of its operation, full gynecological ultrasound and Doppler examinations are performed.

Optometric - Ophthalmological Clinic: Optometry and general ophthalmological examinations are carried out within the scope of its operation.

Ultrasound clinic.

Dermatology Clinic: Dermatological examinations are carried out as part of its operation.

Advisor for Students with Disabilities (FMEA)

For the MSc "Biomedical Engineering and Technology", Prof. E. David has been appointed as the Vise-Adviser of the FMEA and Associate Prof. P. Liaparinos has been appointed as the Adviser of the FMEA.

Student Advocate

The institution of the Student Advocate was established by article 55 of Law No. 4009/2011 in order to mediate between students and professors or administrative services of the Institution, in order to deal with cases of mismanagement, and to ensure the observance of legality and the proper functioning of the Institution. The Student Advocate has no competence in matters relating to examinations and student grades.

Within the framework of its responsibilities, the Student Advocate investigates cases ex officio or following a student's report and mediates with the competent bodies for their resolution.

Awards and Scholarships

The University of West Attica supports both undergraduate and postgraduate students through scholarships and awards. The University, in the context of transparency and meritocracy, announces throughout the academic year various scholarship announcements from the Ministry of Education and Religious Affairs, the State Scholarship Foundation, endowments and other public and private sector institutions.

Career - Professional orientation

The University of West Attica has a Department of Career Counselling & Guidance to support the professional growth and development of its students and graduates, through the provision of advice, organization of career guidance and information events, mentoring, organization of sessions by specialized staff to explore aptitudes and skills, etc.

Link to the labour market

The Department of Liaison, Mediation & Innovation of the University of West Attica is an organized effort of the University of West Attica to support and expand communication between the academic community and the labour market. In essence, the Department of Liaison, Mediation & Innovation acts as a link between the research community of the Institution and the productive and social actors, in an effort to harness the research and creative work of the University's research potential for the benefit of development.

The Department of Liaison, Mediation & Innovation is addressed to all students and graduates of Higher Education, with priority to those of the Foundation, as well as to all private and public sector enterprises, organizations, local government services, and collective bodies such as chambers of commerce, cooperatives, etc.