HELLENIC REPUBLIC
UNIVERSITY OF WEST ATTICA
SCHOOL OF ENGINEERING
DEPARTMENT OF BIOMEDICAL ENGINEERING

Courses offered in English for ERASMUS+ students

Academic Year 2024-2025

Spring/Summer Semester

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*IMPORTANT!!! Learning agreements that list the Diploma Thesis course **will not be approved** without a pre-existing arrangement on the thesis topic with a professor of the Department. For details see page 6.

**Courses are organized in intensive manner within 2-4 weeks period. Attendance to these course is mandatory.

All the courses mentioned above are <u>available exclusively</u> to incoming Erasmus students from the Engineering Faculties, Schools, or Departments that have an active Erasmus agreement with the University of West Attica.

DISCLAIMER

Potential changes in the above list may occur throughout the academic year.

***Before including any of the listed courses in your learning agreement**, please contact the organizing professors for final confirmation. Contact information is provided on the following pages.*

Study Program: Biomedical Engineering

Course Code	NMB.605
Title	**DESIGN AND CONSTRUCTION OF BIOMEDICAL DEVICES**
Teacher	IOANNIS VALAIS
Contact	valais@uniwa.gr
Level	Professor
Semester	6th (spring/summer)
Course contents	Theory Theoretical description of the basic electrical and electronic components used in medical devices. Production and measurement of analogue and digital signals Introduction to Electronics and Microcontrollers Architecture and Microcontroller Subsystems Microcontroller circuits and device connectivity Input-Output Devices Signal acquisition and processing by sensors Microcontroller Programming and Application Programs Microcontroller platforms and connectivity issues Laboratory A complete study of a specific device, containing 1) the theoretical approach to the signal that the device will detect, the electronic schematic, the technical description, the design of the electronic board to be used, and the design of the housing. Introduction to the use of microcontrollers in medical devices, basics and programming examples Simulation of device operation and programming of the embedded microcontroller. Construction of the device, based on the study. Testing, and delivering the device in full and safe mode, in its housing, supplied by its user and maintenance manual
ECTS	4

Course Code	NMB.801
Title	**RADIATION PROTECTION QUALITY ASSURANCE AND CONTROL**
Teacher	GEORGE FOUNTOS
Contact	gfoun@uniwa.gr
Level	Professor
Semester	8th (spring/summer)
Course contents	• Introduction to radiation physics • Radiation sources, Electromagnetic spectrum, Ionizing and non-ionizing radiation, Natural and Artificial sources, Ways of Exposure to Radiation • Radioactivity, Nuclear stability-instability, Radioisotopes, Types of Radiation (α, β, γ, neutrons, etc.) • Radiation-matter Interaction Shielding, Excitement, Ionization or Ionization Law of Exponential Fading, Law Inverse square of Distance. • Dosimetric Units, Absorbed, Equivalent, Active Dose, Skin Dose, DAP Size • Ionizing Radiation Detection, Gas Radiation Detectors, Scintillation Detectors, Detectors Thermoluminescence • Detection of non-ionizing radiation. • Radiation Protection System, International-National Radiation Protection System, Legislation • Protection of exposed workers, Classification and delimitation of zones, Classification of exposed Workers protection measures, Worker exposure assessment • Principles of radiation protection in medical exposure, Medical reports, Optimization of medical reports. • Applied protection measures in Radiology, Nuclear Medicine, Radiotherapy, Legislation. • Influence of imaging parameters on medical image quality • Quality Assurance Programs and Quality Controls, Necessity • Protocols for quality control in Radiology, Nuclear Medicine, Radiotherapy. • How to Perform Quality Controls. • Legislation governing Quality Controls
ECTS	6

Course Code	NMB.807ε
Title	**IMAGE FORMATION SCIENCE**
Teacher	NEKTARIOS KALYVAS
Contact	nkalyvas@uniwa.gr
Level	Professor
Semester	8th (spring/summer)
Course contents	I. Theory of linear systems and mathematical formalization of information and noise transmission in the field and spatial frequencies II. Implementation of the theory of information and noise transmission in Radiology, Nuclear Medicine, Magnetic Resonance Imaging and Ultrasound III. Human observer and subjective image perception. IV. Artifacts in imaging systems. V. Virtual reality and image creation, holography.
ECTS	4

Course Code	NMB.808
Title	**Physical principles of neuroscience**
Teacher	AIKATERINI SKOUROLIAKOU
Contact	kskourol@uniwa.gr
Level	Professor
Semester	8th (spring/summer)
Course contents	Nervous system anatomy and physiology Electrical signalling in the nervous system Synaptic transmission Mathematical modelling Electrodiagnostic techniques (EEG, EMG) Functional imaging (fMRI, PET, fNIRS, SPECT) Therapeutic techniques (TMS, DBS)
ECTS	4

Title	**DIPLOMA THESIS**
Teacher	All Professors of the department
Contact	Before adding the course to the learning agreement, candidates are required to consult with the department's Professors must finalize the thesis topic. A learning agreement will not be endorsed without prior agreement on the thesis subject with a department professor. Contact information for the professors of the department can be found here: https://bme.uniwa.gr/profiles/faculty/. **IMPORTANT**: Learning agreements that list the Diploma Thesis course will not be approved without a pre-existing arrangement on the thesis topic with a department professor.
Semester	10th (spring/summer)
Course contents	• Independent development of a project in the field of biomedical engineering, including literature reviews, software programming, hardware design, and experimental work. • Presentation of the project's findings in both oral and written formats, including writing the thesis and conducting a public defense of the thesis. • ***Regular physical presence required***
ECTS	30

Study Program: MSc in Biomedical Engineering and Technology (MSc courses)

Course Code	BMET.201 **(MSc course)**
Title	**DIAGNOSTIC MEDICAL IMAGING SYSTEMS (available only to MSc students)**
Teacher	STRATOS DAVID
Contact	sdavid@uniwa.gr
Level	Assistant Professor
Semester	2nd (spring/summer)
Course contents	Fundamental concepts in Image Science and Nuclear Medicine Interactions of high energy photons and particles with matter X-ray Tubes, Radioactivity and modes of radioactive decay Basic structure of X-ray energy integrated detectors and gamma photon counting detectors Imaging Instrumentation of Radiology imaging systems Imaging Instrumentation of Nuclear Medicine imaging systems Image Reconstruction Techniques Image Quality and Quality Control Clinical Medical imaging examples (including planar, SPECT, PET etc) Practical exercises in a gamma spectroscopy
ECTS	5

Course Code	BMET.208 **(MSc course)**
Title	**MACHINE LEARNING IN MEDICINE AND BIOLOGY (available only to MSc students)**
Teacher	DIONISIS CAVOURAS
Contact	cavouras@uniwa.gr
Level	Professor Emeritus
Semester	2nd (spring/summer)
Course contents	Introduction Machine Learning in Medicine and Biology (BioMed_ML) Statistics, Biomedical Data Bases, and Software Tools Used in BioMed_ML Supervised BioMed_ML Unsupervised BioMed_ML Deep and Reinforcement Learning in Medicine and Biology Implementation of Machine Learning Models
ECTS	5

Contact

Erasmus office:

https://erasmus.uniwa.gr/en/erasmus-studies/contact/

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For academic inquires:

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