



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

Courses offered in English for ERASMUS+ students

Academic Year 2023-2024

Spring/Summer Semester

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LIST OF COURSES OFFERED IN ENGLISH – SUMMARY

	STUDY PROGRAM	CODE	COURSE TITLE	ECTS
SPRING/SUMMER SEMESTER 2022-2023				
1	Diploma + Integrated MSc in Biomedical Engineering	NMB.605	DESIGN AND CONSTRUCTION OF BIOMEDICAL DEVICES	4
2	Diploma + Integrated MSc in Biomedical Engineering	NMB.801	RADIATION PROTECTION QUALITY ASSURANCE AND CONTROL	6
3	Diploma + Integrated MSc in Biomedical Engineering	NMB.803	MEDICAL IMAGE PROCESSING	5
4	Diploma + Integrated MSc in Biomedical Engineering	NMB.807	IMAGE FORMATION SCIENCE	4
5	Diploma + Integrated MSc in Biomedical Engineering	NMB.808	PHYSICAL PRINCIPLES OF NEUROSCIENCE	4
6	Diploma + Integrated MSc in Biomedical Engineering	NMB.1001	DIPLOMA THESIS	30
7	MSc in Biomedical Engineering and Technology	BMET.201	DIAGNOSTIC MEDICAL IMAGING SYSTEMS	5
8	MSc in Biomedical Engineering and Technology	BMET.208	MACHINE LEARNING IN MEDICINE AND BIOLOGY	5

IMPORTANT NOTICE !!!!

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

Study Program: Biomedical Engineering (Diploma + Integrated MSc courses)

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

Course Code	NMB.801
Title	RADIATION PROTECTION QUALITY ASSURANCE AND CONTROL
Teacher	GEORGE FOUNTOS
Contact	gfoun@uniwa.gr
Level	Professor
Semester	8 th (spring/summer)
Course contents	<ul style="list-style-type: none"> • 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.803
Title	MEDICAL IMAGE PROCESSING
Teacher	DIONISIS CAVOURAS
Contact	cavouras@uniwa.gr
Level	Professor Emeritus
Semester	8 th (spring/summer)
Course contents	<ul style="list-style-type: none"> • Image formation, digitization • Compression and encoding • Image quality, upgrading and restoration, convolution-correlation, field filtering and frequency domain • Image segmentation • Tomographic reconstruction, three-dimensional imaging • Registration and fusion • Clinical applications in X-ray CT, nuclear medicine, MRI, ultrasound, microscopy, thermography, etc.
ECTS	5

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

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

Course Code	NMB.1001
Title	DIPLOMA THESIS
Teacher	All Professors of the department
Contact	Candidates must contact the Professors of the department and agree upon the subject of the Project Thesis (https://bme.uniwa.gr/profiles/faculty/)
Semester	10 th (spring/summer)
Course contents	<ul style="list-style-type: none"> • Independent development of a project in the field of biomedical engineering, including literature reviews, software programming, hardware design, and experimental work • Presentation of the findings of the project in both oral and written formats, writing the Thesis and Public Defense of the Thesis
ECTS	30

Study Program: Biomedical Engineering and Technology (MSc courses)

Course Code	BMET.201
Title	DIAGNOSTIC MEDICAL IMAGING SYSTEMS
Teacher	STRATOS DAVID
Contact	sdavid@uniwa.gr
Level	Assistant Professor
Semester	2 nd (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
Title	MACHINE LEARNING IN MEDICINE AND BIOLOGY
Teacher	DIONISIS CAVOURAS
Contact	cavouras@uniwa.gr
Level	Professor Emeritus
Semester	2 nd (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

For academic inquiries:

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