



**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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# LIST OF COURSES OFFERED IN ENGLISH – SUMMARY

	STUDY PROGRAM	CODE	COURSE TITLE	ECTS
SPRING/SUMMER SEMESTER 2024-2025				
1	Biomedical Engineering	NMB.605	DESIGN AND CONSTRUCTION OF BIOMEDICAL DEVICES	4
2	Biomedical Engineering	NMB.801	RADIATION PROTECTION QUALITY ASSURANCE AND CONTROL	6
3	Biomedical Engineering	NMB.807	IMAGE FORMATION SCIENCE	4
4	Biomedical Engineering	NMB.808	PHYSICAL PRINCIPLES OF NEUROSCIENCE	4
5	Biomedical Engineering	NMB.1001	DIPLOMA THESIS*	30
6	Biomedical Engineering and Technology (MSc)**	BMET.201	DIAGNOSTIC MEDICAL IMAGING SYSTEMS	5
7	Biomedical Engineering and Technology (MSc)**	BMET.208	MACHINE LEARNING IN MEDICINE AND BIOLOGY	5

**\*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.**

## DISCLAIMER

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

***Before including any of the above courses in your learning agreement, please contact the organizing Professors of these courses for final confirmation (contact info is provided in the following pages).***

## Study Program: Biomedical Engineering

Course Code	NMB.605
<b>Title</b>	<b>DESIGN AND CONSTRUCTION OF BIOMEDICAL DEVICES</b>
Teacher	IOANNIS VALAIS
Contact	<a href="mailto:valais@uniwa.gr">valais@uniwa.gr</a>
Level	Professor
Semester	6 <sup>th</sup> (spring/summer)
<b>Course contents</b>	<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
<b>Title</b>	<b>RADIATION PROTECTION QUALITY ASSURANCE AND CONTROL</b>
Teacher	GEORGE FOUNTOS
Contact	<a href="mailto:gfoun@uniwa.gr">gfoun@uniwa.gr</a>
Level	Professor
Semester	8 <sup>th</sup> (spring/summer)
<b>Course contents</b>	<ul style="list-style-type: none"> <li>• Introduction to radiation physics</li> <li>• Radiation sources, Electromagnetic spectrum, Ionizing and non-ionizing radiation, Natural and Artificial sources, Ways of Exposure to Radiation</li> <li>• Radioactivity, Nuclear stability-instability, Radioisotopes, Types of Radiation (<math>\alpha</math>, <math>\beta</math>, <math>\gamma</math>, neutrons, etc.)</li> <li>• Radiation-matter Interaction Shielding, Excitement, Ionization or Ionization Law of Exponential Fading, Law Inverse square of Distance.</li> <li>• Dosimetric Units, Absorbed, Equivalent, Active Dose, Skin Dose, DAP Size</li> <li>• Ionizing Radiation Detection, Gas Radiation Detectors, Scintillation Detectors, Detectors Thermoluminescence</li> <li>• Detection of non-ionizing radiation.</li> <li>• Radiation Protection System, International-National Radiation Protection System, Legislation</li> <li>• Protection of exposed workers, Classification and delimitation of zones, Classification of exposed Workers protection measures, Worker exposure assessment</li> <li>• Principles of radiation protection in medical exposure, Medical reports, Optimization of medical reports.</li> <li>• Applied protection measures in Radiology, Nuclear Medicine, Radiotherapy, Legislation.</li> <li>• Influence of imaging parameters on medical image quality</li> <li>• Quality Assurance Programs and Quality Controls, Necessity</li> <li>• Protocols for quality control in Radiology, Nuclear Medicine, Radiotherapy.</li> <li>• How to Perform Quality Controls.</li> <li>• Legislation governing Quality Controls</li> </ul>
ECTS	6
Course Code	NMB.807ε

<b>Title</b>	<b>IMAGE FORMATION SCIENCE</b>
Teacher	NEKTARIOS KALYVAS
Contact	<a href="mailto:nkalyvas@uniwa.gr">nkalyvas@uniwa.gr</a>
Level	Professor
Semester	8 <sup>th</sup> (spring/summer)
<b>Course contents</b>	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
<b>Title</b>	<b>Physical principles of neuroscience</b>
Teacher	AIKATERINI SKOURLIAKOU
Contact	<a href="mailto:kskourol@uniwa.gr">kskourol@uniwa.gr</a>
Level	Professor
Semester	8 <sup>th</sup> (spring/summer)
<b>Course contents</b>	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

<b>Title</b>	<b>DIPLOMA THESIS</b>
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 to finalize the thesis topic. A learning agreement will not be endorsed without prior agreement on the thesis subject with a department professor.  Contact info for the Professors of the department may be found here: <a href="https://bme.uniwa.gr/profiles/faculty/">https://bme.uniwa.gr/profiles/faculty/</a> .  <b>IMPORTANT!!!</b> Learning agreements that list the Diploma Thesis course <b>will not be approved</b> without a pre-existing arrangement on the thesis topic with a professor of the department.
Semester	10 <sup>th</sup> (spring/summer)
<b>Course contents</b>	<ul style="list-style-type: none"> <li>Independent development of a project in the field of biomedical engineering, including literature reviews, software programming, hardware design, and experimental work</li> <li>Presentation of the findings of the project in both oral and written formats, writing the Thesis and Public Defense of the Thesis</li> </ul>
ECTS	30

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

Course Code	BMET.201 ( <b>MSc course</b> )
<b>Title</b>	<b>DIAGNOSTIC MEDICAL IMAGING SYSTEMS</b>
Teacher	STRATOS DAVID
Contact	<a href="mailto:sdavid@uniwa.gr">sdavid@uniwa.gr</a>
Level	Assistant Professor
Semester	2 <sup>nd</sup> (spring/summer)
<b>Course contents</b>	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 ( <b>MSc course</b> )
<b>Title</b>	<b>MACHINE LEARNING IN MEDICINE AND BIOLOGY</b>
Teacher	DIONISIS CAVOURAS
Contact	<a href="mailto:cavouras@uniwa.gr">cavouras@uniwa.gr</a>
Level	Professor Emeritus
Semester	2 <sup>nd</sup> (spring/summer)
<b>Course contents</b>	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:**

Mr. Stefanos Peroulis

<https://erasmus.uniwa.gr/en/erasmus-traineeship/contact-2/>

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Ms Fani Papoutsi

<https://erasmus.uniwa.gr/en/contact/>

e-mail: [erasmus.global@uniwa.gr](mailto:erasmus.global@uniwa.gr)

## **For academic inquires:**

Dimitris Glotsos, Professor, Departmental Erasmus+ Coordinator

e-mail: [dimglo@uniwa.gr](mailto:dimglo@uniwa.gr)