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

Courses offered in English for ERASMUS+ students

Academic Year 2023-2024

Autumn/Winter Semester

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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).

COURSE CONTENTS

Course Code	NMB.502
Title	**RADIODIAGNOSTIC IMAGING: PHYSICAL PRINCIPLES AND INSTRUMENTATION**
Teacher	PANAGIOTIS LIAPARINOS
Contact	liapkin@uniwa.gr
Level	Associate Professor
Semester	5th (autumn/winter)
Course contents	Interaction of radiation with biological tissues - Radiation emission - X-ray light - Detection systems - High voltage generators - Radiographic diagnostic features - Classical X-ray systems - Generic radiology diagnostic system - Special imaging techniques - Digital radiodiagnostics - Physical principles and computational radiology systems
ECTS	5

Course Code	NMB.702
Title	**MEDICAL SIGNAL PROCESSING**
Teacher	DIONISIS CAVOURAS
Contact	cavouras@uniwa.gr
Level	Professor Emeritus
Semester	7th (autumn/winter)
Course contents	Analogue to Digital conversion of signals • Signals and systems: discrete time signals, signal properties(convolution/correlation) • Frequency domain processing: discrete Fourier transform, frequency domain filters (low pass, high pass, band-pass, band-reject), filtering in the Frequency Domain, Wavelet Transform, Z-transform, digital filter implementations (DFI, DFII, serial, parallel structures), digital filter design: Infinite Impulse Response (IIR), Finite Impulse Response (FIR).Applications of Digital Signal Processing in electrocardiography, electroencephalography, electromyography.
ECTS	5

Course Code	NMB.703
Title	**PHYSICS OF NUCLEAR MEDICINE**
Teacher	GEORGE FOUNTOS
Contact	gfoun@uniwa.gr
Level	Professor
Semester	7th (autumn/winter)
Course contents	• Introduction to Nuclear Physics. • Radioactivity. Production of radioactive isotopes. Radiopharmaceuticals. • Radiation Detectors (Photon Counters): Scintillators, Photomultipliers. • Collimators. Electronic signal modulation, Pulse height analyzers. • Gamma-camera imaging systems and Single photon emission computed tomography systems (SPECT). • Annihilation phenomenon and Positron Emission Tomography (PET) Systems. • Special type imaging and measuring systems (analogue camera, solid-state camera, gamma counters, whole body counters, counters for measuring of functional parameters etc.). • Image quality in Nuclear Medicine. • Dosimetry and Radiation Protection in Nuclear Medicine. • Quality control protocols in Nuclear Medicine.
ECTS	4
Course Code	NMB.705

Title	**LASERS IN MEDICINE**
Teacher	IOANNIS VALAIS
Contact	valais@uniwa.gr
Level	Professor
Semester	7th (autumn/winter)
Course contents	Fiber optics: Principles of operation and applications in medical technology. Laser: Principles of operation, optical cavities, applications in medicine. Effect of Laser beam on tissues Laser treatment induced phenomena Laser emission wavelengths interactions. Laser beam drive systems and categorization. Principles of operation of laser systems and applications in medicine and biology. Classification of Medical Lasers. Beam and system quality controls.Risks and means of protection.
ECTS	2

Course Code	NMB.901
Title	**NON-IONIZING RADIATION IMAGING SYSTEMS**
Teacher	NEKTARIOS KALYVAS
Contact	nkalyvas@uniwa.gr
Level	Associate Professor
Semester	9th (autumn/winter)
Course contents	1. Magnetism of elementary particles. Nuclear Magnetic Resonance effect. Imaging techniques: Gradient fields, K-space and magnetic resonance imaging, pulse sequences, contrast enhancement agents. Magnetic Resonance Imaging Systems: Superconducting Magnets, Permanent Magnets, Radio Frequency Coils, Gradient Coils, etc. Installation and Quality Control of Magnetic Resonance Imaging System. Image quality in Magnetic Resonance, Protection from Electromagnetic Fields. 2. Ultrasound interaction with biological tissues. Piezoelectric effect and piezoelectric transducers. Ultrasonic mechanical and electronic scanning transducers. Doppler effect, Color Flow Display. General Assembly of Ultrasound Systems. Image quality in Ultrasound.
ECTS	2

Course Code	NMB.904
Title	**MACHINE LEARNING**
Teacher	DIONISIS CAVOURAS
Contact	cavouras@uniwa.gr
Level	Professor Emeritus
Semester	9th (autumn/winter)
Course contents	Introduction to Machine Learning basics, supervised learning/regression/classification, unsupervised Learning/dimensionality reduction/clustering, reinforcement learning, deep learning/artificial Neural Networks/convolutional Neural Networks/
ECTS	5

Contact

For academic inquires:

Dimitris Glotsos, Associate Professor, Departmental ERASMUS+ Coordinator
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