ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Α .Δ Ι .Π .
ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ & ΠΙΣΤΟΠΟΙΗΣΗΣ
ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΣΤΗΝ ΑΝΩΤΑΤΗ
ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC
H .Q .A .
HELLENIC QUALITY ASSURANCE
AND ACCREDITATION AGENCY

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ ΚΑΙ ΘΡΑΚΗΣ
ΜΟΝΑΔΑ ΔΙΑΣΦΑΛΙΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΤΕΙ ΑΜΘ

Quality Assurance in Higher Education
Course Data Collection Form

ΤΕΧΝΟΛΟΓΙΚΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ
ΑΝΑΤΟΛΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ & ΘΡΑΚΗΣ
ΑΓΙΟΣ ΛΟΥΚΑΣ,
65404 ΚΑΒΑΛΑ

EASTERN MACEDONIA AND THRACE
INSTITUTE OF TECHNOLOGY
AGIOS LOUKAS
65404 KAVALA

COURSE OUTLINE

(1) GENERAL

SCHOOL	of Technological Applications		
ACADEMIC UNIT	Department of Electrical Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΤ4	**SEMESTER**	**6th**
COURSE TITLE	Medical Electronic and Electrical Devices		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
LecturesandExercises	2 Th.	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	*Specialized general Knowledge*
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek – English in the case of foreign students
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course aims to provide an in-depth understanding, appropriate to an engineer, of medical technologies for clinical applications and an understanding of the electrical hazards to human health..

Upon successful completion of this course the student will be able to:
1. human anatomy and physiology (appropriate to an engineer)
2. physical/electrical properties of human tissues and organs including their biological function
3. electrical and electronic methods for biomolecular and cellular based analytical and diagnostic applications
4. physiological measurement
5. the application and operation of medical imaging systems, monitoring and in vivo sensing systems, drug delivery
6. health related hazards of electrical and electronic devices; nature and approaches taken for hazard management
7. regulation, standardisation of medical technologies and requirements for bringing new technologies to market.
8. Nanocharacterization of bio materials

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
Working independently
Team work
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

(3) SYLLABUS

Anatomy
o anatomical terminology
o structural level of the human body

o muscular, skeletal, nervous, cardio-vascular, respiratory systems
• Physiological instrumentation
o measurement systems
obiopotentials (to include ECG, EMG, EEG and neurostimulation methods)
o cardiovascular instrumentation (to include pacemakers, pressure, dissolved gas measurement)
obiosensing approaches related to remote and intelligent sensing (including evolving technologies i.e. drug delivery, diabetic monitoring, epilepsy and pain management)
• Imaging technology
o X-Ray, gamma camera
o nuclear magnetic resonance imaging
o ultrasound imaging, including doppler ultrasound
• Bioanalysis, diagnositic methods
o electrophoresis, isoelectric focussing as applied to genomic and proteomic applications
o mass spectrometry as applied to proteomic, metabolomics applications
o nuclear magnetic resonance imaging as applied to metabolomics applications
obiophotonic methods for analysis and imaging
o overview of urine, blood and tissue based clinical diagnostic tests
• Biohazards of electrical and electronic devices and related technology
o electrical safety, particularly for medical applications
o electrical environmental hazards and methods for managing these
o radiation hazards
• Sources of information and regulations with regard to medical devices
o Reports and investigations with respect to electrical/electronic technology on human health aspects
o Patent, academic and other research sources for medical technologies
o Regulations, standards, and approaches for taking devices from the research lab to the clinic

Nanocharacterization of bio materials
Small Angle X – ray Scattering
Nitrogen Porosimetry
X- ray diffraction
Scanning Electron Microscopy

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face (in the classroom)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use slides, websiteof the coursewithsupportingandauxiliarymaterial,
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures	26
Essay writing	30
Independent study	34
Course total	90

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical*	Theoretical Course Written work (50%), final writtenexamination (50%), that combines theoreticalquestions with critical ones as well as problems covering all the sectionsof the course.

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

Resource type: Core textbook
Jennings, D, Flint, A, Turton, BCH, Nokes LDM, Introduction to Medical Electronics Applications, Edward Arnold 1995

Resource type: Core textbook
Prutchi, D., Norris, M., Design and Development of Medical Electronic Instrumentation: A Practical Perspective of the Design, Construction, and Test of Medical Devices, Wiley Blackwell, 2004

Resource type: Core textbook
Bushberg, J.T., Seibert, J.A., Boone, J.M., Leidholdt, E.M. The Essential Physics of Medical Imaging, Lippincott Williams and Wilkins, 2000

Resource type: Core textbook
Ellis, H., Logan, B.M., Dixon, A.K., Human Sectional Anatomy: Pocket Atlas of Body Sections, CT and MRI Images, Hodder Arnold, 2001