University of Split

Department of Professional Studies

MEDICAL INSTRUMENTATION

COURSE SYLLABUS

COURSE DETAILS		
Type of study programme	Professional study - 180 ECTS	
Study programme	ELECTRONICS	
Course title	Medical Instrumentation	
Course code	SEL039	
ECTS (Number of credits allocated)	5	
Course status	Core	
Year of study	Third	
Semester	Sixth(spring)	
Course Web site	http://www.oss.unist.hr/	
Total lesson hours per semester	Lectures	30
	Practicals	0
	Laboratory exercises & practical demonstration	30
Prerequisite(s)	None	
Lecturer(s)	Department of Electrical Engineering faculty: Marko Vukšić, Ph.D., College professor	
Language of instruction	Croatian, English	

COURSE DESCRIPTION	
Course Objectives:	• understanding basic principles and phenomena in the area of medical diagnostic instrumentation, • theoretical and practical preparation enabling students to maintain medical instrumentation.
Learning outcomes *On successful completion of this course, student should be able to:*	1. define basic medical terms and physical values that can be handled by medical instrumentation, 2. describe methods and implementation of electrical and non-electrical medical parameters diagnostic, 3. demonstrate measuring of basic medical parameters, 4. calculate basic parameters of the equipment for using in electro diagnostic and electro therapy, 5. recommend problem solving and service procedures for electrical equipment, 6. apply safety standards and select disposal method and procedures for electrical diagnostic equipment.
Course content	Introduction. Basic medical terms and principles of medical instrumentation. Medical physical parameters. Medical sensors and transducers. Instrumentation amplifiers and digital signal processing. Frequency and time domain signal analysis. Data reduction techniques. Medical image systems, image processing. Origin of bioelectric potential. Electrocardiography. Electroencephalography. Respiratory instrumentation. Blood pressure measurement. Cardiac pacemakers. X-ray generation. X-ray equipment. Defibrillators. Ultrasound diagnostic equipment. Basics of radiographic instrumentation.

CONSTRUCTIVE ALIGNMENT – Learning outcomes, teaching and assessment methods

Alignment of students activities with learning outcomes		
Activity	**Student workload ECTS credits**	**Learning outcomes**
Lectures	**30 hours / 1 ECTS**	**1,2,4,5,6**
Practical demonstration	**30 hours / 1 ECTS**	**2,3,5**
Two mid-term exams (preparation and delivery)	**30 hours / 1 ECTS**	**1,2,4,5,6**
Self-study	**48 hours / 1.6 ECTS**	**1,2,3,4,5,6**
Office hours and final exam	**12 hours / 0.4 ECTS**	**1,2,4,5,6**
TOTAL:	**150 hours / 5 ECTS**	**1,2,3,4,5,6**

CONTINUOUS ASSESSMENT		
Continuous testing indicators	**Performance A_i (%)**	**Grade ratio k_i (%)**
Class attendance and participation	**70 - 100**	**10**
Practical demonstration attendance and participation	**80-100**	**40**
First mid-term exam	**50-100**	**25**
Second mid-term exam	**50-100**	**25**

FINAL ASSESSMENT		
Testing indicators – final exam (first and second exam term)	**Performance A_i (%)**	**Grade ratio k_i (%)**

Practical exam (written)	**50 - 100**	**40**
Theoretical exam (written and/or oral)	**50 - 100**	**50**
Previous activities *(include all continuous testing indicators)*	**50 - 100**	**10**
Testing indicators – makeup exam (third and fourth exam term)	**Performance** A_i **(%)**	**Grade ratio** k_i **(%)**
Practical exam (written)	**50 - 100**	**50**
Theoretical exam (written and/or oral)	**50 - 100**	**50**

PERFORMANCE AND GRADE		
Percentage	**Criteria**	**Grade**
50% - 61%	*basic criteria met*	**sufficient (2)**
62% - 74%	*average performance with some errors*	**good (3)**
75% - 87%	*above average performance with minor errors*	**very good (4)**
88% - 100%	*outstanding performance*	**outstanding (5)**

ADDITIONAL INFORMATION

Teaching materials for students (scripts, exercise collections, examples of solved exercises), teaching record, detailed course syllabus, application of e-learning, current information and all other data are available by MOODLE system to all students. (https://moodle.oss.unist.hr/).