

DESCRIPTION/Syllabi of Curricula/Module

Short Name of the University/Country code Date (Month / Year)	DSEA Jan 2019
TITLE OF THE MODULE	Code
Biomedical systems, materials and technologies	P11

Teacher(s)	Department
Coordinating: Eduard Grybkov, Doctor of Sciences (Engineering) Others:	Department of Computer and Information Technology (CIT)

Study cycle (BA/MA)	Level of the module (Semester number)	Type of the module (compulsary/elective)
Bachelor	3 th semester (second year) for Bachelor	Elective

Form of delivery (theory/lab/exercises)	Duration (weeks/months)	Language(s)
Lectures, Lab	15 weeks	Ukrainian / English

Prerequisites	
Prerequisites: the study of disciplines "Higher Mathematics", "Theory of Probabilities and Mathematical Statistics", "Numerical Methods", "Mathematical Methods of Research of Operations".	Co-requisites (if necessary): Programming skills

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
4	120	60	60
Aim of the module (course unit): competences foreseen by the study programme			
Students should be able to: <ul style="list-style-type: none"> - to understand the fundamental concepts of nature and signal processing of biomedical systems, as well as the use of various materials and technologies in biomedical systems. - to master the skills of using various methods for converting and analyzing biomedical signals, for testing biomedical materials and parts made from them. - to apply in practice the techniques of modeling and statistical processing of biomedical signals and results of the testing of materials and parts for biomedical purposes. 			
Learning outcomes of module (course unit)	Teaching/learning methods (theory, lab, exercises)	Assessment methods (written exam, oral exam, reports)	
Knowledge: - familiarization with the main theoretical provisions of the implementation of signal processing methods and their use in specific tasks; - familiarization with the definition of different types of models, their use, testing of hypotheses, the difference between model predictions, concepts of suitability and limitations of models.	Work with the lecture notes and available fundamental subject literature	Knowledge test	
Skills: - formation of theoretical knowledge and acquiring practical skills for the formalization of tasks arising in various spheres of human activity; - formation of the ability to create algorithms for statistical simulation; - development of skills to use different methods of transformation and signal analysis in computerized medical systems.	Lectures, labs, consultations	Active lecture attendance, individual projects and presentations	
Competences: Studying subject literature, sharing knowledge, working in a group	Lectures, labs, consultations	Individual project and presentation	

Themes	Contact work hours						Time and tasks for individual work		
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
1. Biological systems as an object of research and general characteristic of modern methods of their research. System of medical and biological research methods. Measurement in medical and biological practice.	10				10		20	20	Control work / individual task
2. Methods of physiological research.	10				10		20	20	Control work / individual task
3. Experimental and analytical methods for the study of biomedical materials	10				10		20	20	Control work / individual task
Total	30				30		60	60	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Exam	40%	during the semester / exam	Good response to the questions
Practical computer exam	60%	during the semester / exam	The work is done completely without mistakes or minor errors

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Teoh, S. H.	2004	Engineering materials for biomedical applications (Vol. 1).		World Scientific. – 355 p.
Leondes, C. T.	2005	Medical Imaging Systems Technology: Methods in cardiovascular and brain systems (Vol. 5)		World Scientific. – 408 p.
Northrop, R. B.	2016	Signals and systems analysis in biomedical engineering		CRC press. – 654 p.
Additional literature				
И.В. Смирнов, А.М. Старшов	2008	Функциональная диагностика. ЭКГ, реография, спирография		Издательство: Эксмо, 2008 . - 224 с.
В.П. Олейник, С.Н. Кулиш	2004	Аппаратные методы исследований в биологии и медицине		Учеб. пособие. - Харьков: Нац. аэрокосм, ун-т "Харьк. авиац. ин-т", 2004. – 110 с.