

Short Name of the University/Country code Date (Month / Year)	DSEA/P11 September 2020
TITLE OF THE MODULE	Code
Designing and manufacturing of medical products	2.2.14

Teacher(s)	Department
Coordinating: Ph.D. Mikhieienko D.Y. Others:	Department of Computer and Information Technology (CIT)

Study cycle	Level of the module	Type of the module
BA	6 th semester	selective

Form of delivery	Duration	Language (s)
Lectures, seminars	15 weeks	Ukrainian/English

Prerequisites	
Prerequisites: studying the disciplines "Engineering Graphics", "Computer Graphics", "Physics", "Engineering Mechanics"	Co-requisites (if necessary):

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
7,0	210	90	120
Aim of the module (course unit): competences foreseen by the study programmes			
Students should be able to: - design and implementation of software for creation and production of equipment and implants in MCAD / MCAM packages, to integrate with these systems, to work with 3D printers and CNC machines			
Learning outcomes of module (course unit)		Teaching/learning methods	Assessment methods

Knowledge: <ul style="list-style-type: none"> – familiarization with the principles, methods, algorithms, packages of applications for solving the problems of computer aided design; – acquaintance with the systems of automated design of structures and technological processes of various purpose (CAD / CAE / CAM and other systems); – introduction to the basic technologies of rapid prototyping, varieties and design of 3D printers and CNC machines 	Lectures	Test
Skills: <ul style="list-style-type: none"> – formation of theoretical knowledge and acquisition of practical skills for work in modern MCAD-systems; – forming the ability to use modern 3D printers for rapid prototyping, in particular for 3D printing of medical implants; – formation of the ability to use modern CNC machine tools for the production of medical implants 	Seminar	Presentation

Themes	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practicalwork	Laboratory work	Placements	Total contact work	Individual work	Tasks
1 Functions, structure and modules of CAD. CAD / CAM / CAE systems. Medical CAD	6				9		15	20	Study of theoretical material, case study
2. Purpose and main modules of 2D and 3D CAD-systems. Specific modules of medical CAD	6				9		15	20	Study of theoretical material, case study
3. Equipment for CAD systems, 3D printers and CNC machines. Manufacture of medical devices using modern technologies	6				9		15	20	Study of theoretical material, case study
4. Basic methods of creating three-dimensional models in CAD-systems. Examples of creating three-dimensional models of medical implants	6				9		15	20	Study of theoretical material /case study/ presentations
5. Creating assemblies in CAD systems. An example of assembling a three-dimensional model of a joint implant	6				9		15	20	Study of theoretical material/case study/ presentations
6. Parameterization in CAD-systems. Associative design and object-oriented design. An example of creating a parametric model of the implant	6				9		15	20	Study of theoretical material /case study/ presentations
Total	36				54		90	210	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Presentation	40	15 th week	Attendance, activity, presentation
Final test	60	15 th week	Open questions test

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Charles Bell	2013	Maintaining and Troubleshooting Your 3D Printer		Technology in Action
Richard Salinas	2014	3D Printing with RepRap Cookbook		Packt Publishing Ltd. ISBN 978-1-78216-988-8
Additional literature				
Малюх В. Н.	2010	Введение в современные САПР: Курс лекций		М.: ДМК Пресс