MODULE DESCRIPTION

Module code	full-time studies:	**Z-ZIP1-E-602**
	part-time studies:	**Z-ZIPN1-E-602**
Module name	**Computer Aided Engineering**	
Module name in Polish	**Komputerowe wspomaganie prac inżynierskich**	
Valid from academic year	**2019/2020**	

MODULE PLACEMENT IN THE SYLLABUS

Field of study	**MANAGEMENT AND PRODUCTION ENGINEERING**
Level of education	**1st degree**
Studies profile	**General**
Form and method of conducting classes	**Full-time and Part-time**
Specialisation	**All**
Unit conducting the module	**Department of Production Engineering**
Module co-ordinator	**Wacław Gierulski, PhD, DSc**
Approved by:	**Dariusz Bojczuk, PhD, DSc**

MODULE OVERVIEW

Type of subject / group of subjects	**Major**
Module status	**Compulsory**
Language of conducting classes	**English**
Module placement in the syllabus - semester	**Semester VI**
Initial requirements	**Engineering Graphics** **Grafika inżynierska – SolidWorks** **Engineering Design**
Examination (YES/NO)	**NO**
Number of ECTS credit points	**2**

Method of conducting classes		**Lecture**	**Classes**	**Laboratory**	**Project**	**Other**
Per semester	full-time studies:	**15**		**15**		
	part-time studies:	**9**		**9**		

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Category	Symbol	Learning outcomes	Assignations to the directional learning outcomes
Knowledge	W01	The student has an advanced knowledge of the general principles of engineering design, creation and analysis of technical documentation using graphic programs and the possibility of visualization in 3D printing technology.	ZIP_W06
	W02	He has an advanced knowledge of the product life cycle in connection with the environmental burden and knows the engineering possibilities ensuring sustainable development while preserving resources for future generations.	ZIP_W15
	W03	The student has knowledge of introducing new products with elements of innovation, taking into account the principles of the market economy	ZIP_W16
Skills	U01	The student is able to act taking into account intellectual property rights, examine property rights on the basis of the databases of the PPO. He appreciates the value of new innovative solutions and the need for continuous development.	ZIP_U11
	U02	He can see the relationship between the activities and engineering decisions and the non-technical area, including environmental, business and economic aspects.	ZIP_U15
Social competences	K01	The student is aware of the environmental impact of the designed devices and responsibility for their functioning.	ZIP_K02
	K02	Is aware of the responsibility in the implementation of teamwork, compliance with common rules and the need to bear joint responsibility for the implementation process and final effects.	ZIP_K04

TEACHING CONTENTS

Method of conducting classes	Teaching contents
Lecture	Engineering works - design, construction, development of production technology, organization of the production system. Examples. The design process - design assumptions: functions performed, group of recipients, materials used, material consumption, costs. Ergonomics at the design stage. Full life cycle analysis at the design stage - environmental impact. Computer aided design process using SolidWorks software. Prototyping with the use of 3D printing in the design process. Processing of documentation into control files in 3D printers. The concept of a new solution, modification and improvement of products (product development), the issue of innovation. Examples of product development (secondary data) - case study. The process of development of a utility product (not a part of the machine) - subsequent stages. Example.
Laboratory	Implementation of the development process of an exemplary product selected by students. Design assumptions, simplified graphic documentation, necessary calculations, selection of materials, analysis of ergonomic features. Variants of solutions. They should be consumer products and the design is mainly about the shape and materials used. Design considerations can be ignored. Projects carried out in teams with the size specified by the teacher. Designs made with the use of SolidWorks software.

METODS OF ASSESSING TEACHING RESULTS

Symbol	Methods of checking the learning outcomes *(select X)*					
	Oral exam	**Written exam**	**Test**	**Project**	**Statement**	**Other**
W01			X			
W02			X			
W03						
U01				X		
U02				X		
K01				X		X
K02				X		X

FORM AND CONDITIONS OF PASSING

Form of classes	Form of credit	Passing conditions
Lecture	Credit with grade	Obtaining at least 50% of the points in the colloquium in the form of a test carried out in the last lecture classes.
Laboratory	Credit with grade	Obtaining a total of at least 50% of the points from the projects carried out in laboratory classes, analyzed during discussions with the teacher.

STUDENT WORKLOAD

<table>
<tr><th colspan="13">Balance of ECTS points</th></tr>
<tr><td rowspan="3">No.</td><td rowspan="3">Type of student's activity</td><td colspan="10">Student's workload</td><td rowspan="3">Unit</td></tr>
<tr><td colspan="5">full-time</td><td colspan="5">part-time</td></tr>
<tr><td>Lc</td><td>C</td><td>Lb</td><td>P</td><td>O</td><td>Lc</td><td>C</td><td>Lb</td><td>P</td><td>O</td></tr>
<tr><td>1.</td><td>Participation in the activities</td><td>15</td><td></td><td>15</td><td></td><td></td><td>9</td><td></td><td>9</td><td></td><td></td><td>h</td></tr>
<tr><td>2.</td><td>Other (consultation, exam)</td><td>2</td><td></td><td>2</td><td></td><td></td><td>2</td><td></td><td>2</td><td></td><td></td><td>h</td></tr>
<tr><td>3.</td><td>Number of hours of a student's assisted work</td><td colspan="5">34</td><td colspan="5">22</td><td>h</td></tr>
<tr><td>4.</td><td>Number of ECTS credit points which are allocated for assisted work</td><td colspan="5">1,4</td><td colspan="5">0,9</td><td>ECTS</td></tr>
<tr><td>5.</td><td>Number of hours of a student's unassisted work</td><td colspan="5">16</td><td colspan="5">28</td><td>h</td></tr>
<tr><td>6.</td><td>Number of ECTS credit points which a student receives for unassisted work</td><td colspan="5">0,6</td><td colspan="5">1,1</td><td>ECTS</td></tr>
<tr><td>7.</td><td>Work input connected with practical classes</td><td colspan="5">25</td><td colspan="5">25</td><td>h</td></tr>
<tr><td>8.</td><td>Number of ECTS credit points which a student receives for practical classes</td><td colspan="5">1,0</td><td colspan="5">1,0</td><td>ECTS</td></tr>
<tr><td>9.</td><td>Total number of hours of a student's work</td><td colspan="5">50</td><td colspan="5">50</td><td>h</td></tr>
<tr><td>10.</td><td>Punkty ECTS za moduł
1 ECTS=25 hours</td><td colspan="10">2</td><td>ECTS</td></tr>
</table>

LITERATURE

1. Golenko A. (2010), *Fundamentals of Machine Design. A Coursebook for Polish and Foreign Students*, Politechnika Wrocławska, Wrocław (https://www.dbc.wroc.pl/Content/7154/Golenko_Fundamentals%20of%20Machine%20Design.pdf)
2. Lombard M. (2010), *SolidWorks 2010 bible*, Indianapolis, IN: Wiley Pub.
3. Simmons C.H., Phelps N., Maguire D.E (2012), *Manual of Engineering Drawing*, Elsevier Ltd.
4. Zeid I. (2015), *Mastering SolidWorks. The Design Approach*, Pearson Education, New Jersey (http://repo.darmajaya.ac.id/4194/1/Mastering%20SolidWorks_%20The%20Design%20Approach%20%28%20PDFDrive%20%29.pdf)
5. https://www.solidworks.com/