COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Mechatronics</td><td>Degree level and programme type</td><td>Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">Common subject</td><td>Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Computer Aided Design</td><td>Course code</td><td>IS-FME-00248S</td></tr>
<tr><td>Course type</td><td>elective</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>summer</td></tr>
<tr><td>30</td><td></td><td></td><td>30</td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>5</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Technical drawing, Introduction to computer science.</td></tr>
<tr><td>Course objectives</td><td colspan="9">Overview of the structure of CIM systems - integrated design and manufacturing system. To familiarize students with the place of the CAD system in CIM. Types of CAD models. Acquainting with the possibilities of using CAD systems in modelling machine parts. Acquainting students with the possibility of using CAD models in systems CAM. Presentation of the cooperation of the solid model with the tools used for numerical calculations and simulation - CAE. The use of CAD models in rapid prototyping methods and the reverse engineering process. Acquisition by students of skills in creating and editing models of parts and assemblies. Advantages and disadvantages of 3D models using in Computer-Aided Design. Acquiring skills in creating parametric models of parts. Presentations, 3D animations, creating visualizations. Creating 2D technical documentation. The use of vector and raster graphics for the purpose of creating 3D models. Graphics recording formats vector and raster.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: The structure of the CIM system - integrated design and manufacturing systems. Place of the CAD system in integrated design and manufacturing systems. Types of CAD models: 2D and 2.5D models, 3D models: wireframe model, surface model, solid model, and hybrid model. Advantages and disadvantages of the discussed CAD models. Creating parametric and fully defined sketches used in adding the 3D extrude. Features used to create 3D models of mechanical parts. Parent-children relationships which are using to creating of geometrical models. Methods of creating assembly models from part models - "bottom to top" and "top to bottom". Using CAD models in CAM and CAE systems. Use of CAD models in rapid prototyping methods and reverse engineering process. The use of vector and raster graphics in creating 3D models. Vector and raster graphics formats.
Project: Designing and editing parametric part models. Development of 2D technical documentation of parts based on the 3D model parts. Modelling assemblies by the "bottom-up" method. Using and creating libraries of parts about similar geometric features. Preparation of the design of the part models. Design of the selected device. Development of 2D technical drawing documentation of the device.</td></tr>
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Teaching methods	Information and problematic lecture; design exercises.	
Assessment method	Lecture: two tests. Project: test, assessment of completed projects, current work progress, discussions, and activities on classes.	
Symbol of learning outcome	**Learning outcomes**	**Reference to the learning outcomes for the field of study**
LO1	Know and classifies types of CAD models.	M1_W02
LO2	Has knowledge of the possibility of using CAD models in manufacturing and numerical calculations of structural strength.	M1_W02 M1_W03
LO3	Has knowledge of the possibility of using CAD models in in rapid prototyping methods and reverse engineering process.	M1_W02
LO4	Can edit 3D models of mechanical parts.	M1_U07 M1_U01
LO5	Can make 3D assembly model based on the part models.	M1_U07 M1_U01
LO6	Can determine the physical properties of solid 3D models.	M1_U07
LO7	Can develop 2D documentation of mechanical parts based on a 3D model.	M1_U07 M1_U03
LO8	Is aware of the need for further education.	M1_K01
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	Lecture: two tests.	L
LO2	Lecture: two tests.	L
LO3	Lecture: two tests.	L
LO4	Project: test, evaluation of completed projects, ongoing work progress, discussions and activity in the classroom.	P
LO5	Project: evaluation of completed projects, ongoing work progress, discussions and activity in the classroom.	P
LO6	Project: test, evaluation of completed projects, ongoing work progress, discussions and activity in the classroom.	P
LO7	Project: evaluation of completed projects, ongoing work progress, discussions and activity in the classroom.	P
LO8	Project: evaluation of completed projects, ongoing work progress, discussions and activity in the classroom.	P
Student workload (in hours)		**No. of hours**
Calculation	Participation in lectures	**30**
	Participation in design classes	**30**
	Preparation to pass the lecture	**23**
	Preparation for project tasks	**29**
	Performing design tasks	**12**
	Preparation for completing design tasks	**9**
	Participation in consultations	**4**
	TOTAL:	**137**
Quantitative indicators		**HOURS** / **No. of**

			ECTS credits
Student workload – activities that require direct teacher participation		**64**	**2,5**
Student workload – practical activities		**82**	**3**
Basic references	1. Tarnowski W., Podstawy projektowania technicznego, WNT, Warszawa, 1997; 2. Fischer U. [i in.]: Poradnik mechanika, opracowanie w j. polskim Potrykus J., Wyd. REA, 2014; 3. Kurmaz L, Kurmaz O., Podstawy konstruowania węzłów i części maszyn: podręcznik konstruowania, 2011; 4. Keska P., SolidWorks 2013, Modelowanie części, złożenia, rysunki, Wyd. CADvantage, 2013; 5. Weiss Z., Techniki komputerowe w przedsiębiorstwie, Wydawnictwo Politechniki Poznańskiej;		
Supplementary references	1. czasopisma branżowe (np., Design News Polska, Projektowanie i Konstrukcje Inżynierskie); 2. Lombard M., „SolidWorks 2011 Parts Bible", Wiley Publishing, 2011; 3. Lombard M., „SolidWorks 2011 Asemmblies Bible", Wiley Publishing, 2011; 4. SolidWorks Rysunki, Wyd. CNS Solutions, 2012; 5. portale internetowe (np., www.3dcad.pl, www.solidworks.com, www.cns.pl);		
Organisational unit conducting the course	Department of Mechanics and Applied Computer Science	**Date of issuing the programme**	
Author of the programme	Andrzej Łukaszewicz, PhD	21.03.2021	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar