SYLLABUS

Course description

<table>
<tr><td colspan="2">Course code</td><td rowspan="2">Course</td><td colspan="3">KOMPUTEROWE WSPOMAGANIE PROJEKTOWANIA</td></tr>
<tr><td colspan="2">MB/O/I/NST/C1A.6</td><td colspan="3">COMPUTER AIDED DESIGN</td></tr>
<tr><td colspan="2">Language of instruction</td><td colspan="4">English</td></tr>
<tr><td colspan="2">Academic year</td><td colspan="4">2023/2024</td></tr>
<tr><td colspan="2">field of study:</td><td colspan="4">Mechanical engineering</td></tr>
<tr><td colspan="2">field of specialisation:</td><td colspan="4">CAE Computer Aided Engineering</td></tr>
<tr><td colspan="2">Educational level</td><td colspan="4">first-cycle studies</td></tr>
<tr><td colspan="2">Education profile</td><td colspan="4">General academic</td></tr>
<tr><td colspan="2">Mode of study</td><td colspan="4">part-time studies</td></tr>
<tr><td colspan="2">Semester(s)</td><td colspan="4">5, 6</td></tr>
<tr><td colspan="2">Affiliation with a group of classes</td><td colspan="4">Specialization module</td></tr>
<tr><td colspan="2">Course status</td><td colspan="4">Obligatory</td></tr>
<tr><td colspan="2" rowspan="4">Types of classes, instruction hours, ECTS credits</td><td colspan="2">Types of classes</td><td>Number of instruction hours</td><td>Number of ECTS credits</td></tr>
<tr><td colspan="2">Lecture</td><td>16 [h]</td><td rowspan="3">6 ECTS</td></tr>
<tr><td colspan="2">Laboratory</td><td>16 [h]</td></tr>
<tr><td colspan="2">Project</td><td>16[h]</td></tr>
<tr><td rowspan="3">Linkage of the course</td><td>with the education profile</td><td colspan="3">Related to the scientific activity in the discipline to which the field of study is assigned (all-academic profile)</td><td>6 ECTS</td></tr>
<tr><td>with qualifications</td><td colspan="3">Serves the student's acquisition of engineering competence</td><td>6 ECTS</td></tr>
<tr><td>with science discipline</td><td colspan="3">Mechanical engineering</td><td>6 ECTS</td></tr>
<tr><td colspan="2">Form of teaching</td><td colspan="4">Traditional – classes organized at the University /classes conducted using online learning methods and techniques</td></tr>
<tr><td colspan="2">Prerequisites</td><td colspan="4"></td></tr>
<tr><td colspan="2">Department</td><td colspan="4">Faculty of Mechanical Engineering</td></tr>
<tr><td colspan="2">Coordinator</td><td colspan="4">dr inż. Bogdan Noga</td></tr>
<tr><td colspan="2">The website of the basic organizational unit</td><td colspan="4">http://wm.uniwersytetradom.pl</td></tr>
<tr><td colspan="2">E-mail address, phone number of the coordinator</td><td colspan="4">b.noga@uthrad.pl, 48 361 71 23</td></tr>
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LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	The aim of the course is to deepen knowledge of computer-aided design The aim of the course is to improve the competence necessary to use CAD techniques to solve engineering problems The purpose of laboratory exercises is to effectively use CAD systems to solve engineering issues The purpose of the design exercises is to effectively use CAD systems to solve advanced engineering issues
Curriculum Content:	**LECTURE:** Surface design. Design of plastic parts, Design of sheet metal structures. Design of frame structures. Design of welded joints. Design and calculation of shafts. Strength analysis. Design of gears, selection of bearings, splines, keys and splines, etc. Design of tubular structures. **LABORATORY:** Creating, editing and working with designs. Template generation. Parametric design using databases. Advanced solid modelling functions (e.g. drawing folded over tracks, etc.). Editing technical documentation, adapting documentation to technical drawing requirements. Surface modelling. Modelling of plastic parts. Modelling of sheet metal structures. Modelling of frame structures. Modelling of welded structures. Modelling of shafts including strength analysis. Modelling of gears. Modelling of belt/chain transmission. Computer aided selection of bearings, wedges, etc. Modelling of tubular structure. Modelling of electrical wiring harnesses. Visualisation, rendering, motion animation. **DESIGN:** Execution of any computer-aided design e.g.: Belt transmission design: input data for calculations, belt transmission calculations, bearing calculations and selection. Belt and chain gearbox design: input data for calculations, belt gearbox calculations, chain gearbox calculations, shaft calculations, bearing calculations and selection, selection of motor driving the gearbox. Bevel gear design: input data for calculations, gear calculations - mesh correction, shaft calculations, calculations and bearing selection, design and calculations of key and splined connections, optimisation of production costs.
Didactic (educational) methods:	**Lecture**: classes implemented using multimedia presentations. **Laboratory / project**: activities carried out with the use of computer
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	Subject completed on the basis of the grade from the final colloquium

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course (**W**) knows and understands / (**U**) can / (**K**) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Has knowledge of surface design, plastic components, sheet metal structures, frame structures, welded and tubular structures.	K_WG04 K_WG11	Lecture	Colloquium	Correctness of task performance
W2	Has knowledge of computer aided design of shafts, gears, selection of bearings, wedges, keyways and performing strength analyses	K_WG04 K_WG11	Lecture	Colloquium	Correctness of task performance
U1	Can design advanced assemblies, can use a library of standardized elements and can perform motion analysis of the assembly	K_UW05 K_UW14	Laboratory Project	Colloquium	Correctness of task performance
U2	Can design parts and assemblies using calculators and wizards available from CAD systems	K_UW05 K_UW14	Laboratory Project	Colloquium	Correctness of task performance
U3	Can digitally prototype, render and simulate the operation of machinery and equipment	K_UW05 K_UW14	Laboratory Project	Colloquium	Correctness of task performance
K1	Understands the need to use modern design support software in engineering practice	K_KO03	Laboratory Project	Colloquium	Correctness of task performance

Literature and teaching aids
1. B. Noga: Autodesk Inventor. Podstawy projektowania. Helion, Gliwice 2011. 2. B. Noga, Z. Kosma, J. Parczewski: Autodesk Inventor. Pierwsze kroki. Helion, Gliwice 2009. 3. B. Noga, Z. Kosma, J. Parczewski: Laboratorium komputerowych metod inżynierskich, Tom III, Grafika 3D w Autodesk Inventor. Wydawnictwo Politechniki Radomskiej, Radom 2008. 4. F. Stasiak: Zbiór ćwiczeń. Autodesk Inventor 2012. EkspertBooks, Łódź 2011. 5. A. Jaskulski: Autodesk Inventor Professional 2019PL /2019+ /Fusion 360. Metodyka projektowania Wydawnictwo Naukowe PWN, Warszawa 2019 6. Jaskulski: Autodesk Inventor 2020 PL / 2020+. Wydawnictwo Naukowe PWN, Warszawa 2019 7. P. Płuciennik: Projektowanie elementów maszyn z wykorzystaniem programu Autodesk Inventor. Helion, Gliwice 2019 8. L. Kurmaz: Podstawy konstrukcji maszyn - projektowanie. Wydaw. Politechniki Świętokrzyskiej, Kielce 2006.

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits			
Attendance, participation	Student workload [h].		
	Other contact hours (IGK)	Student's self-study hours Classes without a teacher (ZBN**)**	Classes
Participation in lectures	X	X	16 [h]
Participation in .laboratory classes	X	X	16 [h]
Participation in projects	X	X	16 [h]
Meeting with teachers during their duty hours	6 [h]	X	X
Preparation for lectures/classes/.... , Preparation for ... credit / exam	X	6 [h] 30 [h] 40 [h]	X
Total student workload	6 [h]/ 0.3 ECTS	96 [h]/ 3,8 ECTS	48 [h]/ 1,9 ECTS
ECTS credits for the course	150 h/ 6 ECTS		

Additional information, comments
In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate. Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).