SYLLABUS

Course description

Course code	Course	Komputerowe wspomaganie projektowania
ME/O/I/NST/C4		**Computer Aided Design**
Language of instruction		English
Academic year		2025/2026
field of study:		Mechanical Engineering
field of specialisation:		All
Educational level		first-cycle studies
Education profile		General academic
Mode of study		Part-time studies
Semester(s)		5,6
Affiliation with a group of classes		C. Group of courses to chose from
Course status		Obligatory

Types of classes, instruction hours, ECTS credits	Types of classes	Number of instruction hours	Number of ECTS credits
	Lecture	16 [h]	9 ECTS
	Classes	0 [h]	
	Lab	40 [h]	

Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned	ECTS
	with qualifications	It is used to acquire engineering competences by the student	9 ECTS
	with science discipline	Mechanical engineering	ECTS

Form of teaching	Traditional – classes organized at the University /classes conducted using distance learning methods and techniques
Prerequisites	knowledge of mechanics (statics) and mathematics
Department	Faculty of Mechanical Engineering
Coordinator	dr inż. Roman Król
The website of the basic organizational unit	http://wm.uniwersytetradom.pl
E-mail address, phone number of the coordinator	r.krol@uthrad.pl, +48 361 71 12

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:	The condition for passing the course is to achieve all the required learning out comes specified for the course….

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 computer-aided design, manufacturing and operation of mechanical, mechatronic and equipment;	K_WG11	Lecture/ Lab	Test	Correctness of task performance
W2	has knowledge of numerical methods used in simulation and analysis of mechanical	K_WG17	Lab	Test	Correctness of task performance

	systems, as well as in the process of their design, manufacturing and operation;				
U1	can use analytical, simulation and experimental methods to formulate and solve engineering tasks.	K_UW02	Lab	Test	Correctness of task performance
K1	is ready to complete and critically evaluate specialized knowledge and is able to select sources of knowledge and methods of learning appropriate for himself/herself and others;	K_KK01	Lecture/ Lab	Test	Correctness of task performance
K2	is willing to comprehensively analyze and effectively carry out assigned tasks, and in the event of difficulties in solving them, use expert opinion;	K_KK02	Lab	Test	Correctness of task performance

Literature and teaching aids
Primary literature: 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. Additional literature: 1. L. Jumper, R. H. Shih, Parametric Modeling with Autodesk Inventor 2026, SDC Publications 2025 2. R. H. Shih, Learning Autodesk Inventor 2026, SDC Publications 2025 Study aids:

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits		
Attendance, participation	Student workload [h].	
	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in lectures/classes/lab	X	56 [h]
Preparation for lectures/classes/lab , Preparation for ... credit / exam	169 [h]	X
Total student workload Preparation for ... credit / exam	169 [h]/ 6.76 ECTS	56 [h]/ 2.24 ECTS
ECTS points per subject	9 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).