COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S2-ME-201**
	part-time programme:	
Course title in Polish	**Zaawansowane systemy CAD**	
Course title in English	**Advanced CAD Systems**	
Valid from (academic year)	**2024/2025**	

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**second-cycle**
Type of education	**academic**
Mode of study	**full-time programme**
Specialism	**all**
Department responsible	**Department of Machine Design and Machining**
Course leader	**dr inż. Łukasz Nowakowski**
Approved by	**dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering**

COURSE OVERVIEW

Course type		**programme-specific**
Course status		**compulsory**
Language of instruction		**English**
Semester of delivery	full-time programme	**Semester II**
	part-time programme	**Semester II**
Pre-requisites		**-**
Examination required (YES/NO)		**NO**
ECTS value		**2**

Mode of instruction		**lecture**	**class**	**laboratory**	**project**	**seminar**
No. of hours per semester	full-time programme	**15**			**30**	
	part-time programme					

LEARNING OUTCOMES

Category of outcome	**Outcome code**	**Course learning outcomes**	**Corresponding programme outcome code**

Knowledge	W01	The student has an in-depth knowledge of creating and analysing technical documentation using CAD software.	MiBM2_W06
	W02	The student has a well-established and in-depth knowledge related to the use of CAD programmes, is familiar with CAD programmes. The student has detailed and theoretically supported knowledge related to selected issues of mechanical engineering and design of machine parts using CAD software.	MiBM2_W07 MiBM2_W12
Skills	U01	Students will be able to prepare design documentation for machine parts and machinery and equipment using CAD programmes and specialised terminology in the area of design and mechanical engineering. He/she is able to analyse the developed documentation.	MiBM2_U04
	U02	The student is able to design, in accordance with specifications, elements of machine parts and devices using computer aided design of machines, including the ability to assess the technological feasibility of the developed design. The student is able to assess the usefulness of CAD software in design, construction and prototyping of elements of machine parts and devices.	MiBM2_U08
	U03	The student is able to critically analyse the developed design and its operating principle. The student is able to quickly and accurately identify and diagnose a problem related to errors made at the stage of design using CAD systems, including the ability to propose innovative methods of solving it.	MiBM2_U09
Competence	K01	The student is prepared to think and act in an entrepreneurial manner in order to realise optimal organisational actions during the design of machine part components using CAD programmes	MiBM2_K03

COURSE CONTENT

Mode of instruction	Topics covered
lecture	Lectures will cover the following topics, including information on the advanced features of CAD programs with respect to • Modeling and analysis of mechanisms • Simulating and evaluating mechanical systems in terms of displacement, velocity and acceleration, range of motion, reaction forces, inertia forces and moments, and forces and moments transmitted between bodies. • Define the mechanism: determine which components are moving and which are stationary, constrain the motion of the bodies, which determines how they move relative to each other, create mates, define the desired motions of the mechanism, • Create motion objects that represent various mechanical components, including gear connectors, cables, springs, dampers, and bushings. • Create motion objects that represent contact, forces, and moments.
project	As part of the design classes, projects will be carried out to familiarize students with the advanced features of CAD programs used to model and analyze the operation of designed mechanisms and devices. The scope of the design classes will include comprehensive design development in CAD using the kinematic analysis module. and dynamic motion of rigid multi-body shapes and static equilibrium.

ASSESSMENT METHODS

Outcome code	Methods of assessment					
	Oral examination	Written examination	Test	Project	Report	Other
W01			X			
W02			X			
U01				X		
U02				X		
U03				X		
K01						X

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	non-examination assessment	Successful completion of the final colloquium. Receive at least 50% of the grade.
project	non-examination assessment	Successful completion of projects developed in class. The final grade will be the arithmetic average.

OVERALL STUDENT WORKLOAD

ECTS weighting												
No.	Activity type	Student workload										Unit
		full-time programme					part-time programme					
		L	C	Lb	P	S	L	C	Lb	P	S	
1.	Scheduled contact hours	15			30							h
2.	Other contact hours (office hours, examination)	2			2							h
3.	**Total number of contact hours**	**49**										h
4.	**Number of ECTS credits for contact hours**	**1,6**										ECTS
5.	**Number of independent study hours**	**11**										h
6.	**Number of ECTS credits for independent study hours**	**0,4**										ECTS
7.	**Number of practical hours**	**40**										h
8.	**Number of ECTS credits for practical hours**	**1,3**										ECTS
9.	**Total study time**	**60**										h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**2**										ECTS

READING LIST

1. Mazur D., Rudy M.: Modelowanie w systemie NX CAD. Oficyna Wydawnicza Politechniki Rzeszowskie Rzeszów 2016
2. Antosiewicz M.: Modelowanie powierzchniowe, Tom I. Wydawnictwo CAMdivision, Rzeszów 2022.
3. Antosiewicz M.: Modelowanie powierzchniowe, Tom II. Wydawnictwo CAMdivision, Rzeszów 2022.

4. Jóźwiak D., Antosiewicz M.: Podstawy modelowania Synchronous & Realize Shape, Wydawnictwo CAMdivision, Miękkinia 2015.
5. Randy H. Shih, Parametric Modeling with Siemens NX, 2023
6. Sham Tickoo, Siemens NX 2023 for Designers 2023