

Mechanical Engineering

Master Degree Studies

Subject:	<i>Computer Aided Engineering CAE II</i>
Subject type:	<i>Compulsory</i>
Subject code:	
Year:	<i>I</i>
Semester:	<i>2</i>
Form of studies:	<i>Full-time course</i>
Type of classes and hours per semester:	<i>60</i>
Lecture	<i>30</i>
Exercise	
Laboratory practice	<i>30</i>
Project	
ECTS points:	<i>4</i>
Form of credit:	<i>Assessment</i>
Lecture language:	<i>English</i>

Subject objective	
C1	Getting acquainted with the subject of Computer Aided Engineering
C2	Preparing for the use of advanced class CAE software
C3	Get to know the possibilities of realization of calculations and engineering analysis using computer technology

Prerequisites in knowledge, skills and other competencies	
1	Fundamentals of mathematics
2	Fundamentals of mechanics

Educational effects	
	Knowledge:
EK 1	Student knows the advanced class CAE software
EK 2	Student selects appropriate tools of computer technology to solve engineering tasks
	Skills:
EK3	Student performs engineering calculations using advanced CAE software class
EK4	Student is able to analyze and interpret the results of technical calculations, applying computer tools
	Social competencies:
EK5	Student is prepared for professional work with use of support computer techniques
EK6	Student has the ability to think critically, analyze and interpret the results of testing, measurement, data analysis in engineering activities, etc..
Curriculum content of Subject	
Form of classes - Lecture	
	Curriculum content
W1	Introduction to CAE.
W2	Introduction to Matlab, examples of software capabilities, simple calculations,



KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI



UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY



Projekt współfinansowany ze środków Unii Europejskiej
w ramach Europejskiego Funduszu Społecznego

	document creation, the directory structure, system commands, data types, complex commands, expressions.
W3	Introduction to Matlab, examples of software capabilities, simple calculations, creating a document - definitions, variables, range variables, etc. Editing tools, texts, equations and calculations.
W4	Introduction to Matlab, sample algebra calculations, matrices and chains, matrix operators.
W5	Introduction to Matlab - cont., Numbers, functions and mathematical constants, basic functions and constants, Elemental operations, matrix and array arithmetic.
W6	Issues of mathematical statistics in MATLAB, signal analysis.
W7	Two-dimensional and three-dimensional graphics. Symbolic and numerical computation and in Matlab. Toolbox Library.
Class form: laboratory practice	
	Curriculum content
L1	Introductory classes, safety training, credit rules, the division into subgroups, schedule of classes, introduction to CAE.
L2	Introduction to Matlab, examples of software capabilities, simple calculations, document creating, the directory structure, system commands.
L3	Introduction to Matlab, examples of software capabilities, commands, data types, complex commands, expressions.
L4	Introduction to Matlab, examples of software capabilities, simple calculations, creating a document - definitions, variables, range variables, etc. Editing tools, texts, equations and calculations.
L5	Introduction to Matlab, sample algebra calculations, matrices and chains, matrix operators.
L6	Introduction to Matlab - cont., Numbers, functions and mathematical constants, basic functions and constants, Elemental operations, matrix and array arithmetic.
L7	Introduction to Matlab - cont., numerical issues.
L8	Complex data types, the use of functions and operators.
L9	Basic concepts of mathematical statistics in MATLAB, signal analysis.
L10	Descriptive statistics in Matlab.
L11	Two-dimensional graphics and three-dimensional graphics
L12	Symbolic and numerical computation and in Matlab.
L11	Toolbox Library.
L13	Examples of use MATLAB to analyze data obtained in the engineering measurements.
L14	Refresher classes - MATLAB.
L15	Credit with knowledge of MATLAB.
Teaching methodology	
1	Multimedia lecture
2	Laboratory exercises using the computer and specialized software.

Student workload	
Form of activity	Average hours to complete activity



Teacher contact hours, including:	
Hours of contact with the teacher as teaching activities : total hours per semester	60
Hours of contact with the teacher as reference consultations: total hours per semester	
Total student work time, including:	
Individual preparation for laboratory practice: total hours per semester	
Individual preparation for classes: total hours per semester	
Total student work time	
Total ECTS for the subject:	4
Total of ECTS for practical classes (exercise, laboratory practice, projects)	2

Basic reference literature	
1	<i>B. Mrozek, Z. Mrozek, Matlab i Simulink – poradnik użytkownika. Warszawa 2004.</i>
2	<i>A. Kamińska, B. Pańczyk, Matlab – przykłady i zadania. Warszawa 2002.</i>
3	<i>W. Regel, Wykresy i obiekty graficzne w programie Matlab. Warszawa 2003.</i>
4	<i>J. Brzózka, Matlab: środowisko obliczeń naukowo-technicznych. Warszawa 2005.</i>
Complementary reference literature	
1	<i>P. Kłosowski, Metody numeryczne w mechanice konstrukcji : z przykładami w programie MATLAB. Gdańsk 2011.</i>
2	<i>W. Treichel, Matlab dla studentów: Exercise, zadania, rozwiązania. Warszawa 2009.</i>
3	<i>E. Szymczak, Matlab dla mechaników. Warszawa 2006.</i>
4	<i>P. Drozdowski, Wprowadzenie do MATLAB-a : skrypt dla studentów wyższych szkół technicznych. Kraków 1995.</i>

Educational effect	Specific educational effect reference to curriculum-wide effects (PEK)	Subject objective	Curriculum content	Teaching methodology
EK 1	MBM2A_W01 (+++), MBM2A_W03 (++), MBM2A_W04 (+), MBM2A_W06 (+++).	C1	W1-W7, L1-L15	1, 2
EK 2	MBM2A_W01 (+++), MBM2A_W03 (++), MBM2A_W04 (+), MBM2A_W06 (+++), MBM2A_W11 (+).	C2, C3	W1-W7, L1-L15	1, 2
EK 3	MBM2A_U06 (+++), MBM2A_U08 (+++), MBM2A_U12 (+++), MBM2A_U16 (+),	C2, C3	L1-L15	1, 2

	MBM2A_U18 (++).			
EK4	MBM2A_U06 (+++), MBM2A_U07 (++), MBM2A_U08 (+++), MBM2A_U13 (++)	<i>C2, C3</i>	<i>W1-W7, L1-L15</i>	<i>1, 2</i>
EK5	MBM2A_K01 (+), MBM2A_K04 (+).	<i>C1, C2, C3</i>	<i>W1-W7, L1-L15</i>	<i>1, 2</i>
EK6	MBM2A_K01 (+), MBM2A_K04 (+).	<i>C1, C2, C3</i>	<i>W1-W7, L1-L15</i>	<i>1, 2</i>

Evaluation methods and criteria		
Evaluation method symbol	Evaluation method description	Pass threshold
O1	Short task problem which results are discussed in groups.	60%
O2	Written test (tasks for independent solution on the computer) from the scope of the first part of the course - 50% of the final grade.	60%
O3	Written test (tasks for independent solution on the computer) from the scope of the second part of the course - 50% of the final grade.	60%

Curriculum author:	Dariusz Mazurkiewicz, PhD (hab.) Eng.
E-mail:	d.mazurkiewicz@pollub.pl
Unit:	Department of Production Engineering