Kielce University of Technology

FACULTY OF MECHATRONICS AND MECHANICAL ENGINEERING

Annex 9
to the Rector's Ordinance No. 35/19
of 12 June 2019

COURSE SPECIFICATION

Course code	**M#1-S1-ME-212**
Course title in Polish	**Tworzywa sztuczne i materiały kompozytowe**
Course title in English	**Plastics and Composites**
Valid from (academic year)	**2019/2020**

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**first-cycle**
Type of education	**academic**
Mode of study	**full-time**
Specialism	**all**
Department responsible	**Department of Mechanics**
Course leader	**Dr hab. Inż. Monika Madej, prof. PŚk**
Approved by	

COURSE OVERVIEW

Course type	**basic**
Course status	**compulsory**
Language of instruction	English
Semester of delivery	**semester 2**
Pre-requisites	**None**
Examination required (YES/NO)	NO
ECTS value	**2**

Mode of instruction	**lecture**	**class**	**laboratory**	**project**	**seminar**
No. of hours per semester	**15**		**15**		

LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	Has knowledge in the field of physics, including mechanics, kinematics, optics, electricity and magnetism, in particular the knowledge necessary to understand the basic physical phenomena occurring in all types of machines and mechanical devices, including in systems that enable shaping and processing of various types of materials.	MiBM1_W02
	W02	Has elementary knowledge of chemistry, including technical chemistry, necessary for application in mechanics and machine building.	MiBM1_W03
	W03	The student has the knowledge needed to organize work in accordance with health and safety regulations.	MiBM1_W04
	W04	Has a structured knowledge of materials used in mechanics and mechanical engineering, taking into account including metal materials, plastics and composites, has knowledge of the physico-chemical foundations of construction of various types of structures and crystallography.	MiBM1_W11
	W05	Student has a comprehensive knowledge of surface engineering, including various issues related to it, e.g. modeling of the surface layer, assessment of the condition and durability of the surface, tribological tests.	MiBM1_W22
Skills	U01	Can perform measurements of basic geometrical, mechanical, electrical and other quantities related to the manufacturing process of machine parts, can interpret the obtained results, analyze measurement uncertainty and draw conclusions.	MiBM1_U11
	U02	Can use analytical, numerical and simulation methods to formulate and solve engineering tasks in the field of mechanics and machine construction, can properly interpret and use the results of the experiment.	MiBM1_U12
	U03	The student is able to choose the appropriate engineering materials to ensure the correct operation of machines.	MiBM1_U14
	U04	He can properly apply the principles of health and safety and understands the importance of the health and safety management system; is able to find its place in an industrial environment, meeting the principles of occupational health and safety, is able to organize work for itself and for the team in an effective and safe manner.	MiBM1_U17
Competence	K01	Is aware of the importance and understands the relationship between engineering and non-technical activities, in terms of the effects of environmental impact and responsibility for the decisions made.	MiBM1K03
	K02	Can think and act in an entrepreneurial way, understanding the needs of society and the laws governing the natural environment.	MiBM1_K05
	K03	Is aware of the social role of a technical university graduate and understands the need to provide public opinion in an understandable way with information on achievements related to the field of mechanics and machine building.	MiBM1_K06

COURSE CONTENT

Type of instruction*	Topics covered
lecture	1. The importance of polymeric materials in technology.
	2. Basics of science about the chemical structure and structure of polymers. The relationship between the features of the structure of macromolecules and their collections and the properties of plastics.
	3. Classification of polymers according to various criteria.
	4. Physical states of the polymers. The effect of temperature on the mechanical properties of polymers. Temperature characteristics (including vitrification of plastics and elastomers.
	5. Electrical, optical, thermal, and chemical and other methods of assessing these properties.
	6. Natural polymers.
	7. Processes for producing polymers and processing of polymeric materials.
	8. Rules for selection of polymeric materials for technical products.
	9. Fundamentals of recycled polymer materials.
	10. Current directions of development of science and engineering of polymeric materials.
laboratory	1. Read the safety instructions. Principles of work in the laboratory of Plastics and Composite Materials. The organization of classes. Properties of plastics and composites and methods of research.
	2. Testing and evaluation of the thermal properties of plastics and composite materials. The effect of temperature on the properties of polymers.
	3. Testing and assessment of the mechanical properties of plastics and composite materials.
	4. Production and processing of the plastics
	5. Identification of macromolecular compounds.
	6. Measurement of the bulk density.

*) Please delete rows in the table above that are not applicable.

ASSESSMENT METHODS

Outcome code	Methods of assessment *(Mark with an X where applicable)*					
	Oral examination	Written examination	Test	Project	Report	Other
W01		x	x		x	
W02			x			
W03			x			x
W04		x	x		x	
W05		x	x		x	
U01					x	
U02					x	
U03		x	x		x	
U04						x
K01			x			
K02			x			
K03					x	

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	**non-examination assessment**	The pass mark is a minimum of 50% for the final in-class test.
laboratory	non-examination assessment	The pass mark is a minimum of 50% for each in-class pre-lab test and each post-lab report.

*) Please delete rows in the table above that are not applicable.

OVERALL STUDENT WORKLOAD

ECTS weighting							
	Activity type	**Student workload**					**Unit**
1.	Scheduled contact hours	L	C	Lab	P	S	h
		15		15			
2.	Other contact hours (office hours, examination)	2		2			h
3.	**Total number of contact hours**	**34**					h
4.	**Number of ECTS credits for contact hours**	**1,4**					ECTS
5.	**Number of independent study hours**	**16**					h
6.	**Number of ECTS credits for independent study hours**	**0,6**					ECTS
7.	**Number of practical hours**	**25**					h
8.	**Number of ECTS credits for practical hours**	**1**					ECTS
9.	**Total study time**	**50**					h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**2**					ECTS

READING LIST

1. Ashby M.F., Jones D.R.H., Materiały Inżynierskie, WNT Warszawa 1996
2. Gruin I., Ryszkowska J., Markiewicz B., Materiały Polimerowe, Oficyna Wydawnicza PW 1996
3. Ochelski S. T., Metody doświadczalne mechaniki kompozytów konstrukcyjnych, WNT, Warszawa 2004
4. Ozimina D., Madej M., Tworzywa Sztuczne i Materiały Kompozytowe, Skrypt Uczelniany PŚk 447, Kielce 2010
5. Praca zbiorowa pod red. M. Kozłowskiego, Podstawy recyklingu tworzyw sztucznych, Wyd. Politechniki Wrocławskiej, Wrocław 1998
6. Praca zbiorowa pod red. L. Wojnara; Struktura i właściwości kompozytów na osnowie termoplastów, Politechnika Krakowska, Kraków 2005
7. Praca zbiorowa pod red. Floriańczyka., Penczka, S., Chemia Polimerów t. I-III, Oficyna Wydawnicza PW 1995
8. Saechtling, Tworzywa sztuczne-poradnik, WNT, Warszawa 2000
9. Szlezyngier W. H., Tworzywa sztuczne, t.I-III, FOSZE, Rzeszów 1996