



COURSE SPECIFICATION

Course code	M#1-S1-ME-504
Course title in Polish	Podstawy konstrukcji maszyn II
Course title in English	Fundamentals of Machine Design II
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 Machine Design
Course leader	Jaroslaw Galkiewicz, BEng, PhD, DSc
Approved by	

COURSE OVERVIEW

Course type	basic
Course status	compulsory
Language of instruction	English
Semester of delivery	semester 5
Pre-requisites	Fundamentals of Machine Design I
Examination required (YES/NO)	YES
ECTS value	5

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

LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	They will have a basic knowledge of the principles of design of mechanical components and systems.	MiBM1_W18
	W02	They will have knowledge of engineering calculation methods used in mechanics, mechanical design and strength of materials, especially the strength of bars and bar systems, material tension, strength of beams, slabs, shells and thick-walled cylinders subjected to combined loading.	MiBM1_W15
Skills	U01	They will be able to use appropriate IT and communications tools to perform typical engineering tasks.	MiBM1_U02
	U02	On completion of this programme students will be able to obtain information from the literature, databases and other sources in various languages; they are able to combine, analyse and interpret the information, draw conclusions and formulate and justify opinions.	MiBM1_U03
Competence	K01	They will be aware of the responsibility for their professional engagement and will be ready to comply with the principles of team work, taking the responsibility for tasks performed as a team.	MiBM1_K04

COURSE CONTENT

Type of instruction*	Topics covered
lecture	1. Permanent joints
	2. Design of shafts
	3. Rolling contact bearings and sliding contact bearings
	4. Couplings and clutches
	5. Classification of drives
	6. Introduction to gear drives, terminology of gears, involute shape, interference
class	1. Design against a static load (stress calculation for tensile, bending, tearing, and shearing)
	2. Strength assessment of non-permanent joints
	3. Strength assessment of permanent joints
	4. Selection of bearings
laboratory	1. Determination of critical speeds and vibration modes of a machine shaft.
	2. Determination of pressure distribution and Stribeck curve in sliding contact bearings.
	3. Testing of belt drive.
	4. Testing of gear drive.
	5. Vibroacoustic analysis of roller bearings.
	6. Statistical processing of results
project	1. Design of power-screw based mechanism

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

ASSESSMENT METHODS

Outcome code	Methods of assessment <i>(Mark with an X where applicable)</i>					
	Oral examination	Written examination	Test	Project	Report	Other
W01		x		x		
W02		x	x		x	
U01				x		

U02				x		
K01		x		x	x	

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	examination assessment	The pass mark is a minimum of 50% for the examination, extra points for an in-class activity, passing grades of other modes of instruction
class	non-examination assessment	The pass mark for each coursework assignments and a minimum of 50 points for final in-class test.
laboratory	non-examination assessment	The pass mark for each post-lab report.
project	non-examination assessment	The pass mark is a minimum of 50 points out of a possible 100 for the project (including calculations and drawings).

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

OVERALL STUDENT WORKLOAD

ECTS weighting							
	Activity type	Student workload					Unit
		L	C	Lab	P	S	
1.	Scheduled contact hours	15	15	15	15		h
2.	Other contact hours (office hours, examination)	4	2	2	2		h
3.	Total number of contact hours	70					h
4.	Number of ECTS credits for contact hours	2.8					ECTS
5.	Number of independent study hours	55					h
6.	Number of ECTS credits for independent study hours	2.2					ECTS
7.	Number of practical hours	94					h
8.	Number of ECTS credits for practical hours	3.8					ECTS
9.	Total study time	125					h
10.	ECTS credits for the course <i>1 ECTS credit = 25-30 hours of study time</i>	5					ECTS

READING LIST

1. V. B. Bhandari, Design of Machine Elements, Tata McGraw Hill Education Private Limited, 2010
2. R. G. Budynas, J. K. Nisbett, Shigley's Mechanical Engineering Design, McGraw-Hill Education, 2015
3. J. M. Gere, B. J. Goodno, Mechanics of Materials, Eighth Edition, SI, Cengage Learning, 2013
4. Wei Jiang, Analysis and Design of Machine Elements, JohnWiley & Sons Singapore Pte. Ltd, 2019
5. L. W. Kurmaz, O. L. Kurmaz, Podstawy konstruowania węzłów i części maszyn, Wydawnictwo Politechniki Świętokrzyskiej, Kielce 2011 (in Polish)