COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">ERASMUS+</td><td>Degree level and programme type</td><td>Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td>Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Fatigue design structures</td><td>Course code</td><td>IS-FME-00160W</td></tr>
<tr><td>Course type</td><td></td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>winter</td></tr>
<tr><td></td><td></td><td>15</td><td>30</td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>3</td></tr>
<tr><td>Entry requirements</td><td colspan="9"></td></tr>
<tr><td>Course objectives</td><td colspan="9">To provide the students with knowledge of fatigue design structure, basic information about materials strenth, weak point in real structure; to obtain an understanding of influence of notch</td></tr>
<tr><td>Course content</td><td colspan="9">To acquaint students with the impact of changes in the geometry of the strength of parts, determine the impact of the weak links in the durability of the structure. Understand how the impact of selected geometric dimensions on the level of stress and strain components. The use of FEM tools to estimate the fatigue life of the designed parts and the way to control this process. Experimental verification of the results of numerical analysis FEM real objects and how to develop results.
Project: design items using CAD and FEM method, define loads in real items, apply force, moment and etc. finding weakness point analysis
Laboratories:
Analysis of the mechanical properties of materials. Prepare element to strain guage test and fatigue test, do strain guage test, fatigue test, prepare scientific description fatigue test and compare results with FEM analysis.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Project: Students prepare a draft of the selected part using the analytical and numerical calculations in such a way that at certain points achieve this level of stress and strain. By changing the selected geometric dimensions evaluates the load change in the planned construction.
Laboratory: experimentations in groups under supervision of a teacher, lab reports preparing, problem solving</td></tr>
<tr><td>Assessment method</td><td colspan="9">laboratory classes – evaluation of reports, verification of preparation for classes, tests; project – project completion, presentation and discussion</td></tr>
<tr><td>Symbol of</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the</td></tr>
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learning outcome		learning outcomes for the field of study
LO1	Student is able to classify and characterize the load structure	M1_W08, M1_W10, M1_W19
LO2	Student describes the effect of notches on the stress on the machines	M1_U19
LO3	The student understands and describes the influence of geometry on the stress on the machines	M1_U19
LO4	Student can develop experimental results	M1_U02, M1_K03,
LO5		
LO6		
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	printed design and final report	P
LO2	printed design and final report, pre-lab tests, lab reports grading	P, LC
LO3	printed design and final report, pre-lab tests, lab reports grading	P, LC
LO4	pre-lab tests, lab reports grading	LC
LO5		
LO6		
Student workload (in hours)		No. of hours
Calculation	participation in project classes	30
	participation for project classes	15
	participation in laboratory classes	15
	preparation for laboratory classes	30
	participation in student-teacher sessions	10
	TOTAL:	

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	45	1,5
Student workload – practical activities	55	1,5

Basic references	1) Gurney, T. R.: Chapter 5.4 Fatigue Design. Constructional Steel Design. An International Guide. Elsevier Applied Science, 1992. 2) DNV-RP-C203: Fatigue Design of Offshore Steel Structures. October 2008. Det Norske Veritas. 3) Zhang, G., Richter, B., New approach to the numerical fatigue-life prediction of spot-welded structures, Fatigue and Fracture of Engineering Materials and Structures, 23 (2000) 499-508
Supplementary	1) Jakubczak H. Niepewność danych w prognozowaniu trwałości zmęczeniowej

references	**konstrukcji nośnych maszyn. Zeszyt Mechanika. Warszawa: WPW, 2008; 194.** **2) Poutiainen I., Tanskanen P., Marquis G. Finite element methods for structural hot spot stress determination – a comparison of procedures. International Journal of Fatigue, 2004, 26: 1147–1157.** **3) Iida K, Uemura T. Stress concentration factors formulae widely used in Japan. Fatigue Fracture of Engineering Materials & Structures, 1996; 19(6): 779–86.**	
Organisational unit conducting the course	**Department of Machine Construction and Maintenance**	**Date of issuing the programme**
Author of the programme	**Piotr Tarasiuk PhD**	**17.03.2021**

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar

Please notice!
Depending on number of students enrolled for the subject hours of tuition are as follows (for each 30 hours given in course description card):
1 – 2 students - 5 hours of tuition hours;
3 – 4 students - 8 hours of tuition;
5 – 6 students - 11 hours of tuition;
7 – 8 students - 15 hours of tuition;
9 and more students - hours of tuition given by a teacher as regular classes.