Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / ENGINEERING DESIGN

Course:	ENGINEERING DESIGN			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
4125	Mandatory	5	6	3+2+0
Programs	MECHANICAL ENGINEERING			
Prerequisites	No conditionality			
Aims	On completion of this course, students should be able to based on knowledge about the application of modern methods and procedures in the construction of technical systems.			
Learning outcomes	After student finishes with this course, he will be able to: 1. Gather and chose necessary information for projecting new product. 2. Project new product applyimg different methods of methodical construction. 3. Apply different methods for searching for solution of partial function of new product. 4. Make technical and economical evaluation of new product. 5. Optimize solution of new product. 6. Choose proper material for its manufacture.			
Lecturer / Teaching assistant	Prof. dr Darko Bajić			
Methodology	Lectures, Exercise - individual work on the project task, Consultations, Tests			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	The basics, the essence and the importance of the science of designing and the methodical constructing.			
I week exercises	Technical systems. The functional structures.			
II week lectures	Methodical construction. Types of the structures. Phases of construction. Areas of application of methodical construction.			
II week exercises	The total function. Partial functions.			
III week lectures	Methods of methodical construction: Zwickys method of morphological boxes, matrix method of discovery, Hansens method of systematic construction, Kesselrings constructive method.			
III week exercises	The first example of methodical construction.			
IV week lectures	Phases of the construction process. Development of construction products. List of applications.			
IV week exercises	The second example of methodical construction.			
V week lectures	Conceiving. Methods of troubleshoot partial function. Conventional auxiliary methods.			
V week exercises	The third example of methodical construction.			
VI week lectures	Methods of troubleshoot partial function. Intuitive methods: Breinstorming, Methode 6.3.5., Delphy method. Discursive methods fofinding solutions.			
VI week exercises	The first test			
VII week lectures	Methods of troubleshoot partial function. Evaluation criteria as well as measures for making the decision.			
VII week exercises	The first example of partial valuation functions.			
VIII week lectures	The evaluation and decision-making. Determination of kindness. The technical and economic evaluation. S-diagram.			
VIII week exercises	The second example of partial valuation functions.			
IX week lectures	Optimization of physical connection. Mathematical formulation of construction tasks.			
IX week exercises	The third example of partial valuation functions.			
X week lectures	Design. Working steps in the design. The principles shaping in of the design.			
X week exercises	The first example of methodical construction and partial valuation functions.			
XI week lectures	Optimization and other methods matamatičke solutions.			
XI week exercises	The second example of methodical construction and partial valuation functions.			
XII week lectures	Factors of influence and criteria of goodness. The choice of materials in the construction.			
XII week exercises	Choice of materials during construction.			

XIII week lectures	The choice of materials in the design. Basic guidelines for the selection of materials.
XIII week exercises	Choice of materials during construction.
XIV week lectures	Computer aided design.
XIV week exercises	CAD
XV week lectures	The second test.
XV week exercises	Presentation of the seminar paper.
Student workload	Weekly: 4,5 ECTS x 40/30 = 6 hours; Structure: 2 hours lectures, 2 hours laboratory, 2 hours self learning; During semester: Lectures and final exam: 6 hours x 15 weeks = 90 hours; Necessary preparations: before semester beginning (administration, enrollment, validation): 2 x 6 hours = 12 hours; Total hours for the course: 4,5 x 30 hours = 135 hours; Additional work: preparation for remedial exam and remedial exam: 135 hours – (90+12) hours = 33 hours; Load structure: 90 hours (schooling) + 12 hours (preparation) + 33 hours (additional work)

Per week	Per semester
6 credits x 40/30=8 hours and 0 minutes 3 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **3 hour(s) i 0 minuts** of independent work, including consultations	Classes and final exam: **8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts** Total workload for the subject: **6 x 30=180 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **36 hour(s) i 0 minuts** Workload structure: **128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attending lectures and exercises, making homework and colloquiums.
Consultations	2 times per week
Literature	D. Bajić, Inženjersko projektovanje, pripremljena predavanja, 2017 M.Ognjanović: Razvoj i dizajn mašina, Mašinski fakulte Beograd, 2007 G.Pahl, W. Beitz, J.Feldhusen, K.H.Grote: Engineering Design 3rd Ed., Springer-Verlag London, 2007 E.Oberšmit: Nauka
Examination methods	Class attendance: 2 points; Project: 10 points; Two tests: 2 x 19 = 38 points; Final exam: 50 points (written and oral). Passing grade gets if cumulatively collected at least 50 points.
Special remarks	Students actively participates in the exercises. Each student, full equality with the teacher, gives his opinion on the discussed issue. Discussions and comments points out advantages and disadvantages offered solutions of each.
Comment	Additional information in room 418 or darko@ucg.ac.me

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points