UNIVERSITETI /UNIVERSITY
"ISA BOLETINI"
MITROVICË

Course Curriculum Model (Syllabus)		
Faculty:	**FACULTY OF MECHANICAL AND COMPUTER ENGINEERING**	
Department:	Mechanical Engineering	
Level:	Bachelor	
Code of the course:	204 ME	
Course:	**Product Design and Development**	
Course Status:	Mandatory	**Mandatory**/Elective
Semester:	(III)	**Winter**/Summer
Number of hours per week:	2+2	
ECTS:	5	
Time / location:	Monday, 9^{00}-10^{30}, K1	
Year of studies:	2024/2025	
Lecturer:	Prof. Ass. Dr. Fatmir Azemi	
Assistant:		
Contact details:	Professor	Assistant
Email:	fatmir.azemi@umib.net	
Telephone:		

Course description	This course provides a comprehensive exploration of the principles, methodologies, and practices involved in the design and development of engineering products, the course is designed to equip students with the knowledge and skills necessary to navigate the entire product development lifecycle.
Purpose	The purpose of the course "Design and Development of Engineering Products" is to equip students with the knowledge and skills essential for navigating the entire product development lifecycle. The course aims to foster a customer-centric mindset, develop innovative conceptualization and prototyping proficiency, integrate industrial design, promote sustainable and efficient design practices, and provide foundational understanding of intellectual property protection.

Learning outcomes	Upon successful completion of this course, students will be able to: ● Demonstrate a comprehensive understanding of the product development process and its significance in the broader context of engineering. ● Apply methods to identify opportunities, align them with organizational goals, and recognize their strategic importance in the product development landscape. ● Develop a strategic mindset for product planning, including the creation of a product planning framework that aligns with organizational objectives. ● Effectively address and translate customer needs into detailed product specifications, ensuring a customer-centric approach in product development. ● Apply various techniques to generate innovative product concepts, evaluate them using decision matrices, and select the most promising designs for further development.

	Weeks	Lecture
Program	***First week:***	Introduction to Product Design & Development ● Overview of the product development process. ● Importance of product development in engineering.
	Second week:	Development Processes and Organizations ● Understanding different development processes. ● Organizational structures for product development.
	***Third week*:**	Opportunity Identification ● Methods for identifying opportunities. ● Aligning opportunities with organizational goals.
	Fourth week:	Product Planning ● Strategic planning for product development. ● Development of a product planning framework.
	Fifth week:	Identifying Customer Needs ● Techniques for understanding and identifying customer needs. ● Importance of customer-centric product development.
	***Sixth week*:**	Product Specifications ● Developing detailed product specifications. ● Linking customer needs to product specifications.
	Seventh week:	Concept Generation ● Techniques for generating innovative product concepts. ● Brainstorming and ideation sessions.
	Eighth week:	Concept Selection ● Methods for evaluating and selecting the most promising concepts. ● Decision matrices and concept scoring. Midterm Exam
	***Ninth week*:**	Concept Testing ● Strategies for testing and validating product concepts. ● Conducting concept tests and gathering feedback.
	***Tenth week*:**	Product Architecture ● Designing the overall architecture of the product. ● Importance of a well-defined product architecture.
	***Eleventh week*:**	Industrial Design ● Integrating aesthetics and functionality in product design. ● Role of industrial design in enhancing user experience.

	Twelfth week:	Design for Environment ● Considerations for designing products with environmental impact in mind. ● Sustainable design practices.
	Thirteenth week:	Design for Manufacturing ● Strategies for designing products with manufacturing efficiency. ● Minimizing production costs and enhancing manufacturability.
	Fourteenth week:	Prototyping ● Prototyping techniques and their role in the design process. ● Building and testing prototypes.
	Fifteenth week :	Robust Design and Patents ● Principles of robust design for product reliability. ● Understanding patents and protecting intellectual property.

Literature	
Literature	1. " Product Design and Development" Authors: Karl T. Ulrich and Steven D. Eppinger Publication Place and Year: New York, NY, USA; 2015 2. "Design Thinking: Understanding How Designers Think and Work" Author: Nigel Cross Publication Place and Year: New York, NY, USA; 2011 3. "Lean Product and Process Development" Author: Allen C. Ward Publication Place and Year: Cambridge, MA, USA; 2007 4. "Sustainable Product Design" Author: Jonathan Chapman Publication Place and Year: New York, NY, USA; 2009 5. "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" Author: Eric Ries Publication Place and Year: New York, NY, USA; 2011 6. "Design Thinking for Interiors: Inquiry, Experience, Impact" Author: Joy H. Dohr Publication Place and Year: New York, NY, USA; 2012

Teaching methodology

The teaching methodology for the course may involve a combination of the following:

- Lectures: In-class lectures can be used to introduce new concepts and techniques, as well as to provide an overview of the course material.
- Hands-on exercises: Students can be provided with hands-on exercises to practice using the software and tools covered in the course. These exercises can be done individually or in groups, depending on the class size and available resources.
- Case studies: Case studies can be used to illustrate real-world applications of techniques in various industries, such as aerospace, automotive, and consumer products.
- Guest lectures
- Projects: Assigning projects to students can help them apply the concepts and techniques covered in the course to real-world problems. These projects can be done individually or in groups and can be tailored to the interests and skills of the students.
- Discussions and critiques: Engaging students in class discussions and critiques can help them develop their communication and critical thinking skills, as well as provide valuable feedback on their work.

Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours)

Activity	Hours	Days/weeks	Total
Lectures	2	15	30
Exercise sessions (with TA)	2	15	30
Practical work	3	3	9
Office hours	1	15	15
Fieldwork	1	2	2
Midterms, seminars	1	2	2
Homework	3	2	6
Self-study	4	3	12
Final exam preparation	3	3	9
Time spent in exams	3	2	6
Projects, presentations, etc.	2	2	4
Total			**125**

Evaluation

Assessment methodology:

- Homework assignments
- Design projects
- Quizzes and exams
- Presentations
- Lab assignments
- Class participation
- Final project

(according to the Statute and Regulation for studies of UMIB)

Tests / Colloquia (First Test) (Second test)	15% 15%
Practical test during exercises (Essay)	
Workshop seminar	

	Interpretation and presentation of artistic creativity and other works.	
	Assignments and courses during the semester	15%
	Professional practice.	
	Other, Continuity	
	Final exam	55%
	Total	: 100%
	Final grade	Points (%) Mark
		91 – 100 10
		81 - 90 9
		71 - 80 8
		61 - 70 7
		51 - 60 6

Academic policies

Criteria for regular attendance and rules of etiquette during the organization of the lesson are set.

Computer work:
Graphic works, I have to draw and write with a computer. In the works it is obligatory to respect the criteria for both the visual and the content aspect of the required works.

Ethics in teaching:
Graphic works should be personal works of each student. There will be no tolerance for copying, "borrowing" from the Internet or any other material. The same or similar works will have negative evaluations in the final evaluation of the student.

Time:
In agreement with the students, the deadlines for submitting works will be determined. There will be no tolerance for delays in the submission of works. Failure to arrive at the time when the assignment is explained does not justify the student for not submitting the paper. The deadline will be given earlier. If you are going to travel abroad, then you need to submit the paperwork in advance. The student has the right to request a consultation with the professor whenever he / she deems it reasonable and necessary for the performance of his / her work.

Rules of conduct and academic policies:

- active participation of students in lectures o participation in discussion, comments and free expression of opinion, opinion and academic position (with arguments)
- Mandatory independent work and use of additional sources of information (various scientific websites, scientific journals, conference proceedings, etc.)
- Respecting lecture schedules without compromising academic freedom (silent cell phones) of respecting the word, thoughts and ideas of colleagues,
- It is not allowed to arrive late and leave without a valid reason from the lecture, test or exam o preparation and holding of relevant lectures, (obligation of the teacher).
- if the student is absent more than four times without reason in lectures and exercises, does not receive the signature for attendance. o the student cannot take the exam without an official document,
- if the student is dissatisfied with the grade obtained, has the right to complain in writing to the dean, within two working days after the announcement of the results, UMIB Statute o if the student does not follow the rules, in the exam uses tools that are not allowed, it is evaluated with a negative grade.

o

Mitrovica; 29/04/2023 Prof. Ass. Dr. Fatmir Azemi