



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:	306 ME	
Course:	DESIGN FOR MANUFACTURING AND ASSEMBLY	
Course Status:	Elective	Mandatory/ <b>Elective</b>
Semester:	(V)	<b>Winter/Summer</b>
Number of hours per week:	2+2	
ECTS:	5	
Time / location:	Monday, 9 <sup>00</sup> -10 <sup>30</sup> , K1	
Year of studies:	2024/2025	
Lecturer:	Prof. Ass. Dr. Fatmir Azemi	
Assistant:		
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C o u r s e d e s c ri p t i o n	This course provides an introduction to the principles of Design for Manufacturing and Assembly (DFMA). Students will learn how to design products that are easy to manufacture and assemble, resulting in reduced costs, improved quality, and faster time-to-market. The course covers a range of topics, including product design, design analysis, manufacturing processes, assembly methods, and cost estimation. Practical experience will be gained through a series of design projects, where students will apply DFMA principles to develop real-world products.	
P u r p o s e	The purpose of a course on Design for Manufacturing and Assembly is to provide students with an understanding of how to design products that are optimized for manufacturing and assembly. The course aims to teach students how to identify and apply design principles and strategies that can reduce production costs, improve product quality, and speed up the time-to-market. Additionally, the course will help students gain practical experience in using various DFMA tools and techniques to analyze and optimize product designs. The overall goal of the course is to prepare students to become effective designers who can create products that are not only innovative and functional but also efficient and cost-effective to manufacture and assemble.	

<b>L e a r n i n g o u t c o m e s</b>	Upon successful completion of this course, students will be able to:
	<ul style="list-style-type: none"> <li>• Understand the principles and strategies of Design for Manufacturing and Assembly (DFMA) and their applications to product design and development.</li> </ul>
	<ul style="list-style-type: none"> <li>• Analyze the manufacturability and assembly of a product design using DFMA tools and techniques.</li> </ul>
	<ul style="list-style-type: none"> <li>• Apply DFMA principles to design products that are efficient and cost-effective to manufacture and assemble.</li> </ul>
	<ul style="list-style-type: none"> <li>• Evaluate the cost and quality implications of DFMA designs and recommend improvements.</li> </ul>
	<ul style="list-style-type: none"> <li>• Demonstrate the ability to work collaboratively and communicate effectively in a team-based environment.</li> </ul>
	<ul style="list-style-type: none"> <li>• Develop a real-world product design optimized for manufacturability, assembly, and cost using DFMA principles and tools.</li> </ul>

	Weeks	Lecture
<b>P r o g r a m</b>	<i>First week:</i>	Overview of the Course Introduction to DFMA
	<i>Second week:</i>	Product design for manufacturability
	<i>Third week:</i>	Design analysis for manufacturability
	<i>Fourth week:</i>	Manufacturing processes and capabilities
	<i>Fifth week:</i>	Assembly methods and techniques
	<i>Sixth week:</i>	Tolerance analysis and design for assembly
	<i>Seventh week:</i>	Cost estimation and optimization
	<i>Eighth week:</i>	Design for serviceability and sustainability Midterm Exam
	<i>Ninth week:</i>	Design for automation and robotics
	<i>Tenth week:</i>	Design for supply chain management
	<i>Eleventh week:</i>	Case studies of successful DFMA implementations
	<i>Twelfth week:</i>	Emerging trends in DFMA
	<i>Thirteenth week:</i>	Design Project
	<i>Fourteenth week:</i>	Final Project <ul style="list-style-type: none"> <li>• Final project presentation preparation</li> <li>• Final project work and presentation rehearsal</li> </ul>
	<i>Fifteenth week:</i>	Final Project <ul style="list-style-type: none"> <li>• Final project presentations</li> <li>• Course evaluation and feedback</li> </ul>

Literature	
<b>L i t e r a t u r e</b>	<ul style="list-style-type: none"> <li>• "Design for Manufacturability and Assembly" by Geoffrey Boothroyd, Peter Dewhurst, and Winston Knight (2001)</li> <li>• "DFMA: A Framework for Product Design" by Geert W.J. Teeuw (2017)</li> <li>• "Design for Manufacturability: How to Use Concurrent Engineering to Rapidly Develop Low-Cost, High-Quality Products for Lean Production" by David M. Anderson (2014)</li> <li>• "Design for Assembly: Principles and Practice" by Geoffrey Boothroyd and Peter Dewhurst (1991)</li> <li>• "Cost Analysis of Electronic Systems" by Peter Sandborn, Ronald L. Mahler, and Michael Pecht (2011)</li> </ul>

T e a c h i n g m e t h o d o l o g y	The teaching methodology for the DESING FOR MANUFACTURING and ASSEMBLY course may involve a combination of the following:			
	<ul style="list-style-type: none"> <li>• Lectures to provide foundational knowledge on DFMA principles and strategies</li> <li>• Discussions to explore and deepen understanding through critical thinking and active participation</li> <li>• Hands-on projects to apply DFMA tools and techniques to design real-world products</li> <li>• Case studies to demonstrate successful DFMA implementations in real-world scenarios</li> <li>• Guest lectures or site visits to companies with DFMA practices</li> <li>• Assessment based on assignments, quizzes, exams, and a final project</li> <li>• Final project to apply DFMA principles to design a real-world product optimized for manufacturability, assembly, and cost</li> <li>• Emphasis on interactive and practical learning</li> </ul>			
	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
<b>Total</b>				<b>125</b>

E v a l u a t i o n	<b>Assessment methodology:</b>	
	Assignments to analyze existing product designs using DFMA tools and techniques	
	Quizzes and exams to test understanding of DFMA principles and their applications	
	Final project to apply DFMA principles and tools to design a real-world product optimized for manufacturability, assembly, and cost	
	Final project may be done individually or in teams and will require students to work collaboratively and communicate effectively	
	Student participation in discussions, group work, and other in-class activities may be considered in final grade	
	Emphasis on practical application of DFMA principles to real-world scenarios	
	(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
A c a d e m i c s	<b>Criteria for regular attendance and rules of etiquette during the organization of the lesson are set.</b>	
	<b>Computer work:</b>	
	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.	
	<b>Ethics in teaching:</b>	
	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.	
	<b>Time:</b>	
	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.	
	<b>Rules of conduct and academic policies:</b>	
	<ul style="list-style-type: none"> <li>• active participation of students in lectures o participation in discussion, comments and free expression of opinion, opinion and academic position (with arguments)</li> <li>• Mandatory independent work and use of additional sources of information (various scientific websites, scientific journals, conference proceedings, etc.)</li> <li>• Respecting lecture schedules without compromising academic freedom (silent cell phones) of respecting the word, thoughts and ideas of colleagues,</li> <li>• 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).</li> <li>• 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,</li> <li>• 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.</li> </ul>	

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Mitrovica; 29/04/2023

Prof. Ass. Dr. Fatmir Azemi