



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:	303 ME	
Course:	CAD/CAM	
Course Status:	Elective	Mandatory/ Elective
Semester:	(V)	Winter/Summer
Number of hours per week:	2+2	
ECTS:	5	
Time / location:	Wednesday, 9 ⁰⁰ -10 ³⁰ , K5	
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 r i p t i o n	This course covers the principles and practices of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM), with a focus on developing skills in creating 2D and 3D models, generating tool paths, and simulating manufacturing processes using industry-standard software. Students will also learn the basics of CNC machining and programming, as well as the importance of process planning, scheduling, and optimization in modern manufacturing. The course will prepare students for applying CAD/CAM techniques to real-world manufacturing scenarios and collaborating with other team members effectively.	
P u r p o s e (G o a l s)	The purpose of the CAD/CAM course is to provide students with a solid understanding of the principles and practices of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM). Through this course, students will gain hands-on experience using industry-standard software to create 2D and 3D models, generate tool paths, and simulate manufacturing processes. By the end of the course, students will have the knowledge and skills to apply CAD/CAM techniques in real-world manufacturing scenarios, resulting in improved efficiency and productivity in the manufacturing industry. The course also aims to prepare students for careers in fields such as engineering, manufacturing, and product design, where CAD/CAM skills are highly valued.	

L e a r n i n g o u t c o m e s	Upon completion of the course on CAD/CAM, students should be able to: 1. Understand the basics of CNC machining and programming. 2. Demonstrate proficiency in using CAD software to create 2D and 3D models. 3. Demonstrate proficiency in using CAM software to generate tool paths and simulate manufacturing processes. 4. Apply CAD/CAM techniques to real-world manufacturing scenarios and identify opportunities for process improvement. 5. Develop effective communication and critical thinking skills for collaborating with other team members in the manufacturing industry.
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	Weeks	Lecture
P r o g r a m	<i>First week:</i>	Introduction to CAD/CAM • Course overview and syllabus review • Definition of CAD and CAM • History and evolution of CAD/CAM • Overview of CAD and CAM software tools
	<i>Second week:</i>	Introduction to CAD, 2D CAD • Introduction to 2D modeling • Drawing tools and techniques • Layers and object properties • Dimensioning and annotation
	<i>Third week:</i>	3D CAD • Introduction to 3D modeling • Basic geometric modeling techniques • Extruding, revolving, and sweeping • Creating complex models using lofting and blending
	<i>Fourth week:</i>	Solid Modeling • Introduction to solid modeling • Creating sketches and features • Geometric modeling • Basic solid modeling operations • Boolean operations • Surface modeling
	<i>Fifth week:</i>	Assembly Modeling • Introduction to assembly modeling • Creating assemblies from parts • Constraints and mates • Assembly motion and animation
	<i>Sixth week:</i>	CAM Basics • Introduction to Computer-Aided Manufacturing (CAM) • CNC machining and programming basics • Types of CNC machines and controllers • CAM software tools and workflow • Setting up the CAM environment

	Seventh week:	CNC Machining and Simulation • CNC machining processes and tooling • G-Code programming basics • Verification and simulation of CNC programs
	Eighth week:	Midterm Exam
	Ninth week:	Post-processing and Tool Path Optimization • Post-processing of CAM programs • Tool path optimization • High-speed machining techniques
	Tenth week:	CAD/CAM Integration Basics • CAD and CAM data exchange • Process planning and scheduling • Manufacturing process optimization
	Eleventh week:	Applications of CAD/CAM in Manufacturing • Application of CAD/CAM in machining processes • Case study CAM Mill Programming for CNC Machinists
	Twelfth week:	Applications of CAD/CAM in Manufacturing • Application of CAD/CAM in machining processes • Case study CAM Turning Programming for CNC Machinists
	Thirteenth week:	Applications of CAD/CAM in Manufacturing • Feature recognition and machining automation • CAM post-processing and machine simulation • CNC programming and process validation
	Fourteenth week:	Final Project • Final project presentation preparation • Final project work and presentation rehearsal
	Fifteenth week :	Final Project • Final project presentations • Course evaluation and feedback

Literature	
L i t e r a t u r e	• "Mastering CAD/CAM" by Ibrahim Zeid and R. Sivasubramanian (2010) • "Computer-Aided Design and Manufacturing" by M. Groover, E. Zimmers, and R. Agogino (2012) • "CAM Design Handbook" by Harold Rothbart and Thomas Stover (2004) • "Introduction to CAD/CAM Systems" by Mikell Groover and Emory Zimmers (2014) • "CAD/CAM: Principles and Applications" by P.N. Rao (2009) • "CAD/CAM: Concepts and Applications" by Alavudeen and N. Venkata Reddy (2019) • "Computer-Aided Design and Manufacturing: A Technological and Social Perspective" by Geoffrey Boothroyd and Brian Josephson (2018) • "Integrated CAD/CAM Systems: Design, Implementation and Evaluation" by Wai-Kwok Wong and David Zhang (2020)

T e a c h i n g m e t h o d o l o g y	The teaching methodology for the CAD/CAM 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 CAD/CAM techniques in various industries, such as aerospace, automotive, and consumer products. • Guest lectures: Inviting guest speakers from industry or academia can provide students with additional perspectives on the applications and challenges of CAD/CAM in various fields. • 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	2	2	4
	Homework	3	2	6
	Self-study	4	3	12
	Final exam preparation	3	3	9
	Time spent in exams	2	2	4
	Projects, presentations, etc.	2	2	4
Total				125

E v a l u a t i o n	Assessment methodology:		
	- Homework assignments: Students can be given regular homework assignments to practice using the CAD/CAM software and to reinforce the concepts taught in class. - Design projects: Students can be assigned design projects that require them to apply the CAD/CAM skills and knowledge learned in class. This can be done individually or in teams. - Quizzes and exams: Short quizzes or exams can be given periodically to test students' understanding of the material covered in class. - Presentations: Students can be asked to give presentations on a topic related to CAD/CAM. This can help them develop their communication skills and deepen their understanding of the subject matter. - Lab assignments: Students can be given lab assignments that require them to use the CAD/CAM software to design and manufacture physical parts or prototypes. - Class participation: Students can be assessed based on their active participation in class discussions, group work, and other class activities. - Final project: Students can be asked to complete a final project that demonstrates their mastery of the CAD/CAM skills and knowledge acquired throughout the course. The project can be a design project or a manufacturing project, and can be done individually or in teams.		
	(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,(Specify) Participation	10%	
	Final exam	45%	
	Total	100%	
	Final grade	Points (%)	Mark
		91 – 100	10
		81 - 90	9
		71 - 80	8
		61 - 70	7
		51 - 60	6

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.

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Mitrovica; 29/04/2023

Prof. Ass. Dr. Fatmir Azemi