



UNIVERSITETI / UNIVERSITY
"ISA BOLETINI"
MITROVICË

Course Curriculum Model (Syllabus)		
Faculty:	FACULTY OF MECHANICAL AND COMPUTER ENGINEERING	
Department:	Mechanical Engineering and Economic Engineering	
Study Program	MSc in Manufacturing Technology and Management	
Level:	Master	
Code of the course:	101MTM	
Course:	Advanced Manufacturing Processes	
Course Status:	Mandatory	Mandatory/Elective
Semester:	I	Winter/Summer
Number of hours per week:	2+2	
ECTS:	5	
Time / location:	Wednesday, 9 ⁰⁰ -10 ³⁰ , K5	
Academic Year / Semester	2026/2027	
Language of Instruction:	Albanian (with flexibility in English)	
Lecturer:	Prof. Ass. Dr. Fatmir Azemi	
Assistant:		
Contact details:	Professor	Assistant
Email:	fatmir.azemi@umib.net	
Telephone:		
Course Description	This course explores advanced manufacturing technologies, with a focus on processes such as additive manufacturing, high-speed machining, precision engineering, micro-manufacturing, and hybrid manufacturing. Emphasis is placed on the theoretical principles, technological capabilities, and practical applications of these advanced methods in modern industry. The course combines case studies, laboratory demonstrations, and problem-solving sessions.	
Course Purpose / Course Goals	The purpose of this course is to provide students with in-depth knowledge and practical skills related to modern and non-traditional manufacturing processes. It aims to develop the ability to select, analyze, and optimize advanced manufacturing techniques such as electrical discharge machining, laser processing, additive manufacturing, and hybrid systems. The course also fosters a critical understanding of how these technologies contribute to higher productivity, precision, flexibility, and sustainability in modern production systems.	
Course Objectives	- To provide an understanding of key advanced manufacturing technologies. - To analyze the impact of modern manufacturing processes on product design, performance, and cost. - To evaluate and select appropriate advanced technologies for manufacturing scenarios.	

Intended Learning Outcomes (ILOs)	Knowledge • K1: Explain the principles and classifications of advanced manufacturing processes (e.g., EDM, ECM, laser machining, ultrasonic machining). • K2: Understand the material behavior and technological challenges in non-traditional and hybrid manufacturing methods. • K3: Describe the integration of automation and digital technologies in advanced manufacturing environments.
	Skills • S1: Select appropriate advanced manufacturing techniques based on design and material requirements. • S2: Analyze process parameters and their effect on quality, precision, and productivity. • S3: Use modern tools/software for simulation, modeling, and process optimization (e.g., ANSYS, DEFORM, CAM tools). Competences • C1: Design efficient and sustainable manufacturing solutions using advanced technologies. • C2: Solve complex engineering problems related to precision machining, tooling, and surface integrity. • C3: Collaborate in multidisciplinary teams to implement innovative manufacturing strategies in real-world applications.

	Weeks	Lecture
Program	<i>First week</i>	Introduction to Advanced Manufacturing
	<i>Second week</i>	Additive Manufacturing (3D Printing)
	<i>Third week</i>	Laser-Based Manufacturing
	<i>Fourth week</i>	Micro- and Nano-Manufacturing
	<i>Fifth week</i>	High-Speed Machining
	<i>Sixth week</i>	Hybrid Manufacturing Techniques
	<i>Seventh week</i>	Midterm Exam
	<i>Eighth week</i>	Manufacturing Process Selection
	<i>Ninth week</i>	Surface Engineering and Finishing
	<i>Tenth week</i>	Applications in Aerospace and Biomedical Sectors
	<i>Eleventh week</i>	Quality Assurance in Advanced Manufacturing
	<i>Twelfth week</i>	Sustainability in Advanced Manufacturing
	<i>Thirteenth week</i>	Case Studies and Industry Practices
	<i>Fourteenth week</i>	Student Presentations
	<i>Fifteenth week</i>	Review and Feedback and Submission of Projects

Literature / Reading List:	
Literature	1. Ghosh, A. & Mallik, A. K. (2021). <i>Manufacturing Science</i>. 3rd Ed., East West Press. 2. Kalpakjian, S., & Schmid, S. R. (2020). <i>Manufacturing Engineering and Technology</i>. 8th Ed., Pearson Education. 3. Groover, M. P. (2019). <i>Fundamentals of Modern Manufacturing: Materials, Processes, and Systems</i>. 7th Ed., Wiley. 4. Elanchezhian, C. (2022). <i>Advanced Manufacturing Processes</i>. Laxmi Publications. Supplementary / Recent Literature: 5. J. Paulo Davim (Ed.) (2023). <i>Modern Manufacturing Processes</i>. Springer. [Covers sustainable and hybrid processes] 6. Shivani, K. M. & Singh, D. (2022). <i>Additive Manufacturing and Advanced Functional Materials</i>. CRC Press. 7. Hasan, R. & Zhang, Y. (2021). <i>Advanced Manufacturing: Progress, Trends and Challenges</i>. MDPI (Open Access). 8. Journal of Manufacturing Processes – Elsevier. (Latest issues available via ScienceDirect) 9. Procedia Manufacturing – Elsevier. (For conference papers and applied studies) 10. International Journal of Advanced Manufacturing Technology – Springer.

Teaching and Learning Methods	Lectures, Case Studies, Group Projects, Practical Lab Sessions, Industrial Guest Lectures			
	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

Evaluation	Assessment Methods and Criteria:		
	Activity	Weight (%)	
	Midterm Exam	20%	
	Project Report & Defense	30%	
	Seminar Presentation	10%	
	Final Exam	40%	
	Total	100%	
	(according to the Statute and Regulation for studies of UMIB)		
	Final grade	Points (%)	Mark
		91 – 100	10
	81 - 90	9	
	71 - 80	8	
	61 - 70	7	
	51 - 60	6	

Attendance, Ethics and Deadlines

Criteria for regular attendance and rules of conduct during the teaching process are established. Students are expected to actively participate in lectures, exercises, discussions, and other learning activities.

Computer-Based Work

Assignments, projects, technical reports, and presentations must be prepared using a computer. Students are required to comply with technical, scientific, and professional standards, as well as with the visual and content-related requirements of the assigned work. Proper academic writing, correct terminology, and appropriate formatting are expected in all submissions.

Academic Ethics

All assignments, projects, and reports must be the original work of the student or the assigned group. Plagiarism, copying, or the use of materials from the internet or other sources without proper citation and referencing will not be tolerated. Identical or substantially similar submissions will be considered a violation of academic integrity and will receive negative evaluation.

Deadlines

Submission deadlines for assignments, projects, and reports will be determined in agreement with the students. Late submissions will not be accepted without valid justification. Absence from the class when an assignment is explained does not exempt the student from the responsibility of completing and submitting the work. Students who expect to be absent due to travel or other commitments should submit their work before the deadline whenever possible. Students have the right to request consultations with the instructor whenever they consider it necessary for the successful completion of their assignments and projects.

Rules of conduct and academic policies:

- active participation of students in lectures or 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 or 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. or 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 or if the student does not follow the rules, in the exam uses tools that are not allowed, it is evaluated with a negative grade.
- Plagiarism or cheating will be penalized according to university regulations.