



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:	103MTM	
Course:	Research Methods in Engineering	
Course Status:	Mandatory	Mandatory/Elective
Semester:	I	Winter/Summer
Number of hours per week:	2+0	
ECTS:	5	
Time / location:		
Academic Year / Semester	2026/2027	
Language of Instruction:	Albanian	
Lecturer:	Prof. Assoc. Dr. Faton Merovci	
Assistant:		
Contact details:	Professor	Assistant
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	Telephone:	
Course Description	This course covers the principles of research design and methodology in the field of engineering and manufacturing. Topics include qualitative and quantitative methods, literature review, data analysis, and ethical concerns in engineering research and academic publishing.	
Course Purpose / Course Goals	The purpose of this course is to prepare students with the methodological knowledge and ethical awareness required to conduct rigorous and responsible research in engineering and manufacturing. The course aims to: • Develop an understanding of core research paradigms and designs. • Equip students with tools to critically review and synthesize academic literature. • Strengthen students' ability to design and execute research projects independently. • Promote ethical awareness in engineering research, including workplace safety, environmental sustainability, and professional standards. • Prepare students for writing and defending high-quality research proposals, theses, and reports.	

Course Objectives	By the end of the course, students will be able to: - Understand and apply qualitative, quantitative, and mixed research methodologies. - Formulate research questions, hypotheses, and objectives relevant to manufacturing and engineering contexts. - Conduct academic literature reviews and evaluate sources critically. - Collect, analyze, and interpret research data using appropriate techniques. - Recognize and address ethical issues in engineering research, including safety, plagiarism, authorship, bias, and environmental impact. - Structure and write effective research proposals and reports. - Communicate research findings clearly and professionally in academic and applied contexts.
Intended Learning Outcomes (ILOs)	Knowledge and Understanding • Understand qualitative and quantitative research methodologies. • Recognize ethical considerations in engineering practice and research. • Identify best practices for literature reviews and data analysis. Skills • Apply research design and methodologies in engineering/manufacturing projects. • Structure and write research proposals. • Analyze and interpret research data. Competences • Evaluate ethical issues in engineering and manufacturing research and practice. • Plan and execute research projects independently. • Communicate research findings effectively.

	Weeks	Lecture
Program	<i>First week</i>	Introduction to research in engineering; types of research (applied vs. theoretical, industrial vs. academic)
	<i>Second week</i>	Research problems, questions, hypotheses, and objectives in engineering projects
	<i>Third week</i>	Academic Literature Reviews; databases, synthesis
	<i>Fourth week</i>	Research integrity, plagiarism, authorship, academic publishing
	<i>Fifth week</i>	Ethics in engineering: workplace safety, environmental sustainability, professional codes
	<i>Sixth week</i>	Principles of experimental design: variables, sampling, validity, reliability
	<i>Seventh week</i>	Quantitative methods I: descriptive statistics, visualization, surveys
	<i>Eighth week</i>	Quantitative methods II: inferential statistics, regression
	<i>Ninth week</i>	Qualitative methods I: interviews, focus groups, observation; Human-Centred Design
	<i>Tenth week</i>	Qualitative methods II: content analysis, coding, triangulation
	<i>Eleventh week</i>	Data collection & analysis in engineering projects: lab work, simulations, industrial experiments
	<i>Twelfth week</i>	Academic writing: structure of papers, theses, citations
	<i>Thirteenth week</i>	Research proposals & project planning
	<i>Fourteenth week</i>	Peer review, conferences, journal publications, predatory journals

	Fifteenth week	Student presentations; reflection on ethics and case studies in engineering research
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Literature / Reading List:

Literature	1. Creswell, J.W. & Creswell, J.D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (6th ed.). 2. Oates, B. J., Griffiths, M., & McLean, R. (2022). Researching information systems and computing. Sage. 3. Montgomery, D. C. (2017). Design and analysis of experiments. John Wiley & sons. 4. Yin, R. K. (2018). Case study research and applications (Vol. 6). Thousand Oaks, CA: Sage. 5. Schlossberger, E. (2023). Ethical engineering: a practical guide with case studies. CRC Press.
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Teaching and Learning Methods	The course combines lectures for theoretical concepts with exercises and computer labs for practical applications. Students learn through case studies, problem-solving tasks, and independent projects. • Structured Lectures: introducing probability and statistical methods, including probability distributions, regression, ANOVA, and hypothesis testing. • Problem-Based Learning (PBL): solving real-world decision-making problems using statistical reasoning. • Flipped Classroom: pre-class reading and preparation with datasets, followed by in-class analysis and discussion. • Project-Based Learning: applying statistical tools (R software) to analyze managerial and engineering datasets. • Case Studies: exploring applications of statistical analysis in business, engineering, and quality control contexts. • Laboratory Demonstrations: practical training in R for statistical modeling, simulation, and interpretation of results. • Guest Lectures: insights from industry experts on data-driven decision-making.			
	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
	Office hours (consultations)	1	5	5
	Midterms, seminars	2	4	8
	Homework / Assignments	3	6	18
	Self-study (independent work)	3	15	45
	Final exam preparation	3	3	9
	Time spent in exams	2	2	4
	Projects, presentations, etc.	2	3	6
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
Academic policies	Criteria for regular attendance and rules of etiquette during the organization of the lesson are set.		
	Academic Work:		
	Assignments, literature reviews, and project reports must be completed individually and in accordance with academic writing standards. Submissions must respect both the formal requirements (structure, referencing, citations) and the content requirements of the course.		
	Ethics in teaching:		
	All assignments and projects must be the personal work 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 attend the session when an assignment is explained does not justify late or missing submission. 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. - Plagiarism or cheating will be penalized according to university regulations.		

Mitrovica; 27.08.2025

Prof. Asoc. Dr. Faton Merovci