



UNIVERSITETI / UNIVERSITY
"ISA BOLETINI"
MITROVICË

Syllabusi		
Faculty:	Faculty of Mechanical and Computer Engineering	
Department:	Computer science and engineering	
Level:	VI	
Course code:	108-CSE	
Course:	MEASUREMENT AND DATA ACQUISITION SYSTEMS	
Status i lendes:	Electiv	Compulsory/ Elective
Semmesstre:	(II)	winter/ summer
Number of hour in week:	2+2	
ECTS:	6	
Time/Place:	Monday, 9 ⁰⁰ -10 ³⁰ , 10 ⁴⁵ - 12 ¹⁵ S203	
Study year:	2025/2026	
Lecture:	Prof. Ass. Dr. Luan Mulaku	
Assistent:		
Contact:	Professor	Assistant
Email:	luan.mulaku@umib.net	
Telephone:	+38344495600	
Description course	This course provides in-depth knowledge of measurement and data acquisition systems, including measuring instruments, data collection techniques, and their analysis. Students will become familiar with the theory and practices used in the field of measurement, as well as gain practical skills in the use and calibration of measuring devices. The course also includes various practical applications and projects aimed at developing students' abilities to apply the acquired knowledge in real technical situations.	
Goals	The objective of this course is to provide students with in-depth and integrated knowledge of measurement and data acquisition systems. The course aims to enable students to understand and apply measurement techniques and instruments, as well as to analyze and interpret collected data accurately and effectively. Furthermore, students will gain practical skills in the use and calibration of measuring devices, preparing them for practical challenges in industry and scientific research.	
Learning outcomesit	Upon completion of this course, students will be able to: • Understand the basic principles of measurement and data acquisition systems. • Identify and use various measuring instruments in practical applications. • Apply methods of data collection, storage, and analysis. • Evaluate the accuracy and errors in measurements and data. • Calibrate measuring devices according to specified standards. • Analyze and interpret collected data to make informed technical decisions. • Work effectively on laboratory projects and practical applications. • Communicate technical results clearly and professionally, both in writing and orally.	

Week	Lectures
Week I	Introduction to measurement and data acquisition: • Definition of the field

		• Importance and practical applications • Main components and system process
	Week II	Types of measurement systems: • Sensors, amplifiers, filters • Sensor–controller–storage interfacing • Basics of system design
	Week III	Measuring instruments: • Multimeters, oscilloscopes, thermometers • Adjustment and calibration • Accuracy and influence of environmental factors
	Week IV	Data acquisition: • Methods of data collection • Data storage and format standards • Communication with PC: USB, Ethernet, serial
	Week V	Data processing: • Filtering, averaging, statistical analysis • Use of software tools for processing • Basic visualization and reporting
	Week VI	Safety and accuracy in the system: • Measurement errors and tolerance calculation • Advanced calibration • Methods for reducing systematic errors
	Week VII	Midterm exam
	Week VIII	Practical applications: • Measurement systems in industry (temperature, pressure) • Airport, laboratory, and environmental scales • Scientific research and system design
	Week IX	Group project: • Topic selection, planning, and design • Construction, testing, and data collection • Reporting and preliminary presentation
	Week X	Problem solving: • Analysis of data defects • Troubleshooting hardware and software elements • Error documentation and system improvement
	Week XI	Automation and signals: • Interfacing with PLC/Arduino • Analog and digital signals • Basic programming for automation
	Week XII:	Project review: • Advanced system testing • Extended result analysis • Integration with network and remote monitoring
	Week XIII	Project review: • Advanced system testing • Extended result analysis • Integration with network and remote monitoring
	Week XIV	Course review: • Gathering key concepts • Q&A sessions • Preparation for the final exam • Ethical and social considerations related to robots

	Week XV	Course evaluation: • Review of course topics and concepts • Course assessment and feedback
--	----------------	---

Literature				
Literature	1. Dr. Jusuf Gacaferri, Matjet Elektriike, 1996, 2. Dr. Ali Gashi, Matjet Elektriike, 2016 3. Morris A. S, Langari R. (2012). Measurement and Instrumentation: Theory and Application, Elsevier 4. Tumanski S. (2006). Principles of Electrical Measurement. Taylor & Francis group			
	Teaching Methodology for the Course "Measurement and Data Acquisition Systems" may include a combination of the following: • Lectures: The instructor may use lectures to introduce and explain fundamental principles, concepts, and techniques related to measurement systems and data acquisition. Lectures may incorporate visual aids such as slides, videos, and live demonstrations. • Laboratory Exercises: The course may include lab sessions where students apply theoretical knowledge in practical scenarios. These exercises may involve configuring sensors, collecting data, calibrating instruments, and working with data acquisition hardware and software. • Group Projects: Students may be assigned group projects requiring them to collaboratively design, build, and test measurement and data acquisition systems to solve specific problems. These projects typically involve iterative development and incorporate feedback from the instructor and peers. • Class Discussions: In-class discussions may be used to promote active learning and critical thinking. The instructor may use open-ended questions, case studies, and problem-solving tasks to encourage participation and deeper understanding of the subject. • Online Resources: Supplementary online materials such as instructional videos, interactive tutorials, and quizzes may be provided to reinforce classroom content and allow for self-paced learning outside of scheduled class time. • Feedback and Assessment: Students' progress may be evaluated through quizzes, exams, lab reports, and project presentations. Constructive feedback is used to identify areas for improvement and help guide students toward achieving the intended learning outcomes of the course.			
Teaching methodology	Student Workload Contribution (Aligned with Learning Outcomes 1 ECTS = 25 hour)			
	Aktiviteti	ore	dite/jave	Total
	Lecture	2	15	30
	Exercises (practical seminars)	2	5	10
	Practical work (laboratory)	2	10	20
	Office hours / instructor consultations			
	Field work	1	2	2
	Thematic seminars	1	1	2
	Homework	4	4	16
	Individual work	1	5	5
	Preparation for final exam	5	5	25
	Time spent on tests (midterm & final)	1	1	2
	Course evaluation and reflection	2	2	4
Total				125

Evaluation	Assessment Methodology: The assessment methods may include the following: • Quizzes and exams to evaluate the understanding of course concepts and principles. • Laboratory exercises and projects to assess practical skills and technical competencies. • Written reports and oral presentations to evaluate communication abilities and presentation skills. • Class participation and engagement in discussions and group activities to assess active involvement and collaborative learning. <i>(Based on the Statute and Study Regulations of UMIB)</i>		
	Tests / Colloquiums (two tests, 2 x 10%)	15%	
	Practical tests during exercises	15%	
	Seminar work		
	Professional and logical structure, and diverse use of language. Interpretation and presentation of creativity		
	Assignment	15%	
	Professional practice	15%	
	Final exam	45%	
	Total	: 100%	
	Final grade	Points (%)	Mark
		91 – 100	10
		81 - 90	9
		71 - 80	8
		61 - 70	7
		51 - 60	6

ACADEMIC POLICIES	Further Instructions: • Computer Work Written assignments must be typed on a computer. Both the visual and content-related criteria of the assignments are mandatory to follow. During the preparation of assignments, proper spelling rules and APA style must be strictly respected. • Academic Ethics All semester assignments must be the original work of each student. There will be zero tolerance for plagiarism, copying, or “borrowing” material from the internet or any other sources. Identical or very similar works will receive negative evaluations in the student’s final grade. • Deadlines Deadlines for submitting assignments will be agreed upon with the students. Late submissions will not be tolerated. Absence from the class when the assignment is explained does not justify failure to submit the work. Deadlines will be announced in advance. If you plan to travel abroad, you must submit your work earlier. Students have the right to request consultations with the professor whenever they consider it necessary for completing their assignments. • Rules of Conduct and Academic Policies: • Active student participation in lectures • Participation in discussions, comments, and free expression of opinions, views, and academic stances (with supporting arguments) • Independent work is mandatory, and the use of additional information sources (various scientific websites, journals, conference proceedings, etc.) is encouraged • Respect for lecture schedules without infringing academic freedom (e.g., mobile phones on silent mode) • Respect for colleagues’ speech, opinions, and ideas • Low tolerance for late arrivals and unjustified early departures • Preparation and provision of relevant lectures (teacher’s obligation) ○
-------------------	--