

SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University
1.2 Faculty	Faculty of Mathematics and Computer Science
1.3 Department	Department of Computer Science
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Information Engineering

2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)	Electronic measurements, Sensors and transducers Masuratori electronice, Senzori si traductoare						
2.2 Course coordinator	L.Ph.d.eng. Praisach Zeno Iosif						
2.3 Laboratory coordinator	L.Ph.d.eng. Praisach Zeno Iosif						
2.4. Year of study	IV	2.5 Semester	7	2.6. Type of evaluation	E	2.7 Type of discipline	Compulsory DD
2.8 Code of the discipline	MLE7031						

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2 LP
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					44 hours
Learning using manual, course support, bibliography, course notes					26
Additional documentation (in libraries, on electronic platforms, field documentation)					4
Preparation for seminars/labs, homework, papers, portfolios and essays					8
Tutorship					2
Evaluations					2
Other activities:					2
3.7 Total individual study hours					44
3.8 Total hours per semester					100
3.9 Number of ECTS credits					4

4. Prerequisites (if necessary)

4.1. curriculum	•
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4.2. competencies	•
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5. Conditions (if necessary)

5.1. for the course	•
5.2. for the seminar /lab activities	• Knowledge of laboratory work

6. Specific competencies acquired

Professional competencies	<ul style="list-style-type: none"> • CP5.1 - Appropriate use of the operating principles of electronic devices and circuits, as well as methods of measuring electrical quantities. • CP5.4 - Use of electronic tools to characterize and evaluate the performance of electronic circuits.
Transversal competencies	<ul style="list-style-type: none"> • CT1 – Honorable, responsible, ethical behavior, in the spirit of the law, to ensure the professional reputation. • CT3 - Demonstrating initiative and pro-active behavior for updating professional, economical and organizational culture knowledge.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> • Development of scientific thinking, familiarization of the future specialist with the basic notions about sensors and transducers and how they operate.
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> • developing the student's ability to understand the notions of sensors and transducers, the student's awareness of the need to use them. • identification of sensors and transducers and their operation. • awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning, done correctly and on time.

8. Content

8.1 Course	Teaching methods	Remarks
1. Defining sensors and transducers. The structure of a sensor / transducer. The place of sensors / transducers in automatic systems.	Exposure, problematization, heuristic conversation, explanation, challenging students to dialogue	2 hours
2. Data acquisition through sensors and transducers.		4 hours
3. Temperature transducers.		2 hours
4. Transmitters for mechanical processes.		4 hours
5. Transmitters for electrical processes.		4 hours

6. Flow transducers.		2 hours
7. Level transducers.		2 hours
8. Characteristics and performance of sensors / transducers in stationary and in dynamic regime		2 hours
9. Automotive transducers.		2 hours
10. Smart sensors. Contact and non-contact smart touch sensors for industrial robots.		4 hours

Bibliography

- Ignea A., Stoiciu D., *Măsurări electronice. Senzori și traductoare*, Editura „Politehnica”, Timișoara, 2006
- G.Ionescu, V.Sgarciu – *Traductoare pentru aplicatii industriale*, vol.1-1986, vol.2-1996, Ed.Tehnica
- Răduca M., *Sisteme de măsurare și instrumentație*, Editura „Eftimie Murgu”, Reșița, 2010;
- V.Sgarciu, D.Popescu – *Echipamente pentru masurarea si controlul parametrilor de proces*, Ed.Electra-ICPE, 2003.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Specific problems of laboratory work safety technique.	Group work, problem solving and discovery, linking theoretical knowledge to practical applications	2 hours
2. Identification of sensors and transducers for electrical and non-electrical quantities. Sensitive element and their adapter.		2 hours
3. LabVIEW Graphic Programming Language. SCXI specialized modules for data acquisition.		2 hours
4. Design and development of virtual tools in the LabVIEW graphical programming language for real-time acquisition of electrical and non-electrical quantities.		4 hours
5. Real-time temperature measurement via temperature transducer.		2 hours
6. Real-time vibration measurement of a rod with mechanical size transducers and acquisition of signals in LabVIEW.		2 hours
7. Real-time measurement of electrical quantities by means of current transducers and acquisition of signals in LabVIEW.		2 hours
8. Real-time measurement of electrical quantities by means of voltage transducers and acquisition of signals in LabVIEW.		2 hours
9. Study of optical transducers.		2 hours
10. Study of flow transducers.		2 hours
11. Real-time measurement of noise level.		2 hours
12. Completion of laboratory activities.		4 hours

Bibliography

- Documentation guides for the transducers used

- LabVIEW Documentation Guides
- Valeriu D., *Masurarea marimilor electrice si neelectrice, Curs*, Universitatea Tehnica „Gh. Asachi”, Iasi, 2009.

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- They have been established with the main employers by previous discussions at the study programme substantiation

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Participating in debates	Number of interventions	10 %
	Level of knowledge gained	Exam (written)	60 %
10.5 Seminar/lab activities	Involvement in activities	Interventions	10 %
	The level of practical skills acquired	Interactive	20 %
10.6 Minimum performance standards			
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Date

05.2022

Signature of course coordinator

L.Ph.d.eng. Praisach Zeno Iosif

Signature of seminar coordinator

L.Ph.d.eng. Praisach Zeno Iosif

Date of approval

24.05.2022

Signature of the head of department

Prof. dr. Laura Dioşan