SYLLABUS

Approved,
DEAN
Prof.univ.dr.ing.Gilbert-Rainer GILLICH

1. Program Data

1.1. Institution of Higher Education	**Babeș-Bolyai University**
1.2. Faculty	**Faculty of Engineering**
1.3.Department	**Department of Engineering Science**
1.4. Field of Study	**Electrical Engineering**
1.5. Course of Study	**Bachelor**
1.6. Study Programme	**Electromechanics**

2. Discipline Data

2.1. Discipline Name	Industrial instrumentation						
2.2. Course Coordinator	Conf.univ.dr.ing. Mihaela Molnar						
2.3.1. Seminary Coordinator							
2.3.2. Laboratory Coordinator	Conf.univ.dr.ing. Mihaela Molnar						
2.3.3. Project Coordinator	Conf.univ.dr.ing. Mihaela Molnar						
2.4. Year of Study	IV	2.5. Semester	I	2.6. Evaluation Time	C	2.7. Discipline Regime	Optional

3. Estimated Total Time (hours per semester of teaching activities)

3.1. Number of Hours per Week	5	from which: 3.2. Course	2	3.3. laboratory&project	3
3.4. Total Hours from the Curriculum Plan	70	from which: 3.5. Course	28	3.6. laboratory&project	42
Time Fund Distribution - hours					55
Study of Handbook, Course Materials, Bibliography & Notes					20
Additional Documentation in Library, on Special E-learning Platforms & in the Field					15
Preparation of seminaries/laboratories/ projects, topics, reports, portfolios & essays					17
Mentoring					-
Examination					3
Other Activities					

3.7. Total Time of Individual Study	**55**
3.8. Total Hours per Semester	**125**
3.9. Number of Credits	**5**

4. Pre-condition (where is the case)

4.1. of Curriculum	•
4.2. of Competences	•

5. Condition (where is the case)

5.1. of Course Progress	•
5.2.1. of Seminary Progress	•
5.2.2. of Laboratory Progress	•
5.2.3. of Project Progress	•

6. Acquired Specific Competences

Professional Competences	• Operating with specialized concepts in the field of computer technology and information technology. (CP2) • Analysis and interpretation of the results of measurement and recording of electrical and non-electrical quantities in the electromechanical system, made with specific equipment and data acquisition systems. (CP4)

Transversal Competences	• Efficient use of information resources and of assisted communication and training resources (internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation. (CT3)

7. Discipline Objectives (coming out from the Checklist of Acquired Specific Competences)

7.1. General Objective of Discipline	• Development of scientific thinking, familiarization of the future specialist with the fundamental notions of virtual instrumentation, in order to develop virtual instruments.
7.2. Specific Objectives	• Developing the student's ability to understand the notions of virtual instrumentation, the student's awareness of the need to use virtual instrumentation. • Identification and development of virtual tools. • Awareness of the importance of training during the semester for good and lasting results, awareness of the importance of research, own research related to learning, done correctly and on time.

8. Content

8.1. Course	Teaching methods	Observation
1. Discipline objectives. Generalities.	Presentation; Discussion.	2 hours
2. Information. Measurement. Use. Signal. Virtual instrumentation and data acquisition.		2 hours
3. Data acquisition systems. Definitions. Information flow. The components of a data acquisition system. Hardware and software for a data acquisition system.		2 hours
4. The structure of a virtual tool. Functions of virtual instruments. Advantages and disadvantages of virtual instruments. Virtual instrumentation applications.		2 hours
5. LabVIEW Graphic Programming Language. Launching. Benefits. Acquisition, analysis and presentation of data with LabVIEW.		2 hours
6. LabVIEW Graphic Programming Language. Creating a virtual tool with LabVIEW. Front panel, control palette, block diagram, function palette.		2 hours
7. LabVIEW Graphic Programming Language. Creating a virtual tool with LabVIEW. Tool palette. Object editing techniques.		2 hours
8. LabVIEW Graphic Programming Language. Input / output files.		2 hours
9. Organize virtual tools in LabVIEW for data acquisition.		2 hours
10. LabVIEW Graphic Programming Language. Control structures (programming).		2 hours
11. LabVIEW Graphic Programming Language. Creating a virtual sub tool (subIV).		2 hours
12. LabVIEW Graphic Programming Language. Vectors and matrices.		2 hours
13. LabVIEW Graphic Programming Language. Strings.		2 hours
14. LabVIEW Graphic Programming Language. Groups (clusters).		2 hours
Bibliography • Carmen Bujoreanu; „LABVIEW, prietenul nostru”, IAŞI, 2015 • Cristian Foşalău; “Introducere în instrumentaţia virtuală”, Editura CERMI, Iaşi, 2010; • Mihaela Molnar; Course notes; • Ciprian Şorândaru; “Instrumentaţie virtuală în ingineria electrică”, Editura Orizonturi Universitare, 2003.		
8.2.1. Seminary -	Teaching methods	Observation
8.2.2. Laboratory	Teaching methods	Observation
1. Health and safety in laboratory.	Measurements, Discussion, Explanation.	2 hours
2. Introduction to the LabVIEW graphical programming language.		2 hours
3. Numerical, logical, and comparison functions in the LabVIEW graphical programming language. Virtual instrument for calculating the sum and		2 hours

product of natural numbers.		
4. Conversion functions in the LabVIEW graphical programming language. Virtual instrument for converting a natural number to four-bit, octal and hexadecimal numbering systems.		2 hours
5. Use and represent different types of data in the LabVIEW graphical programming language. Comparison functions. Virtual instrument for warning of exceeding the extreme values of a quantity.		2 hours
6. Generating signals in the LabVIEW graphical programming language. Virtual instrument for generating and displaying signals.		2 hours
7. Evaluation, debt remaining hours.		2 hours
Bibliography • Carmen Bujoreanu; „LABVIEW, prietenul nostru", IAŞI, 2015 • Cristian Foşalău; "Introducere în instrumentaţia virtuală", Editura CERMI, Iaşi, 2010; • Limbajul de programare grafică LabVIEW.		
8.2.3. Project:	Teaching methods	Observation
Development, implementation and testing in LabVIEW of a virtual tool for determining electrical quantities.	Calculation; Discussion; Questioning.	2 hours
1. Distribution and analysis of design themes		2 hours
2. Establishing the input and output parameters for the designed virtual instrument. The role of the designed virtual tool.		2 hours
3. Analysis of the elements of the front panel of the designed virtual instrument.		2 hours
4. Analysis of the block diagram of the designed virtual instrument.		2 hours
5. How the designed virtual instrument works. Simulate it for different input variables.		2 hours
6. Simulation of possible errors of the designed virtual instrument and ways to eliminate them.		2 hours
7. Final discussions on the project. Completion of the project activity.		2 hours
Bibliography • Carmen Bujoreanu; „LABVIEW, prietenul nostru", IAŞI, 2015 • Cristian Foşalău; "Introducere în instrumentaţia virtuală", Editura CERMI, Iaşi, 2010; • Ciprian Şorândaru; "Instrumentaţie virtuală în ingineria electrică", Editura Orizonturi Universitare, 2003. • Limbajul de programare grafică LabVIEW.		

9. Corroborating Discipline's Contents with the Expectation of the Epistemic Community Representatives, the Professional Associations and the Employers' Representatives from the Programme Corresponding Field

- 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. Weight from the final grade
10.4. Course	Debates participation	Number of interventions	10 %
	Acquired knowledge level	Colloquium (oral)	60 %
10.5.1. Seminary	Activity / implication		
	Gained competence level		
10.5.2. Laboratory	Activity / implication	Interventions	10 %
	Gained competence level in practice	Interactive	10 %
10.5.3. Project	Readiness in phrasing the project stages	Interventions	5 %
	Project quality	Interactive	5 %
10.6. Performance Minimum Standard			
• Completion of Applicative Activities. • Completion of each colloquium subject by the minimum grade of 5.			

Completion Date	Course Coordinator's Signature	Laboratory / Project Coordinator's Signature
05.05.2022	Conf.univ.dr.ing. Mihaela Molnar	Conf.univ.dr.ing. Mihaela Molnar
Department Endorsement Date		Chief of Department Signature
.....		Ș.l.dr.fiz. Cornel Haţiegan