

SYLLABUS

Approved,
DEAN

1. Program Data

1.1. Institution of Higher Education	Babeş-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	Electric drives I						
2.2. Course Coordinator	Lect. dr. eng. Elisabeta SPUNEI						
2.3.1. Seminary Coordinator	-						
2.3.2. Laboratory Coordinator	Lect. dr. eng. Elisabeta SPUNEI						
2.3.3. Project Coordinator	-						
2.4. Year of Study	IV	2.5. Semester	7	2.6. Evaluation Time	E	2.7. Discipline Regime	Obl.

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

3.1. Number of Hours per Week	4	from which: 3.2. Course	2	3.3. laboratory	2
3.4. Total Hours from the Curriculum Plan	56	from which: 3.5. Course	28	3.6. laboratory	28
Time Fund Distribution - hours					69
Study of Handbook, Course Materials, Bibliography & Notes					28
Additional Documentation in Library, on Special E-learning Platforms & in the Field					9
Preparation of seminars/laboratories/ projects, topics, reports, portfolios & essays					28
Mentoring					2
Examination					2
Other Activities					-
3.7. Total Time of Individual Study	69				
3.8. Total Hours per Semester	125				
3.9. Number of Credits	5				

4. Pre-condition (where is the case)

4.1. of Curriculum	• Electric Machines, Electronics, Electrical Circuit Theory, Electrical Measurements
4.2. of Competences	• Measurement of electrical and mechanical quantities, selection of electrical machines and appliances, use of Excel software

5. Condition (where is the case)

5.1. of Course Progress	• During class and lab hours, student phones will be set to silent mode and no calls will be accepted during teaching activities.
5.2.1. of Seminary Progress	-
5.2.2. of Laboratory Progress	• The theoretical part of the laboratory work will be prepared in advance by the students. Only those papers which have completed all the stages indicated and have drawn conclusions will be awarded a pass mark. The deadline for handing in the work is agreed between the teacher and the students. Papers which are not handed in by the deadline, or which have not been marked with a minimum of 5 marks, will be considered as not completed and will have to be made up.
5.2.3. of Project Progress	-

6. Acquired Specific Competences

Professional Competences	<ul style="list-style-type: none"> CP1: Application and appropriateness of specialist knowledge of mathematics, physics, computer science specific to electrical engineering. CP4: Analyse and interpret the results of measuring and recording electrical and non-electrical quantities in the electromechanical system using specific equipment and data acquisition systems. CP6: Organise maintenance activities of electromechanical systems.
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Transversal Competences	<ul style="list-style-type: none"> CT1: Identify the objectives to be achieved, the resources available, the conditions for their completion, the work stages, the related deadlines and the related risks; CT2: Identify roles and responsibilities in a multidisciplinary team and apply effective team working and interpersonal techniques.
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7. Discipline Objectives (coming out from the Checklist of Acquired Specific Competences)

7.1. General Objective of Discipline	<ul style="list-style-type: none"> Familiarity with general concepts applied in electric drives and drive systems powered from constant voltage sources.
7.2. Specific Objectives	<ul style="list-style-type: none"> Correctly capture the phenomena that occur during starting, braking and speed regulation of electric drive systems powered from constant voltage sources; To develop skills in testing drive systems for different speeds and interpreting the results of measurements.

8. Content

8.1. Course	Teaching methods	Observation
1. General elements of electric drives. Introduction. Structure of electric drive systems. Operating mode and service.	Presentation; Discussion.	4 hours / on-line
2. General elements of electric drives. Kinematics and dynamics of electric drives. Equation of motion. Relation of moments of inertia and masses to the same shaft. Transmission components between motor and machine.	- // -	4 hours / on-line
3. General elements of electric drives. Mechanical characteristics and speeds of working machines. Static stability of electric drives. Transient processes in electric drives. Speed change in electrical machines	- // -	2 hours / on-line
4. Electric drives with DC machines supplied from constant voltage sources - Drives with d.c. machines with shunt and separate excitation: general, mechanical characteristics.	- // -	2 hours / on-line
5. Electric drives with DC machines supplied from constant voltage sources - Drives with d.c. machines with shunt and separate excitation: starting mode, electrical braking mode.	- // -	4 hours / on-line
6. Electric drives with d.c. machines supplied from constant voltage sources - Drives with series and mixed excitation DC machines: starting mode, electrical braking mode, reversing mode.	- // -	2 hours / on-line
7. Electric drives with alternating current machines supplied from constant voltage sources - Asynchronous machine drives: general, mechanical characteristics.	- // -	2 hours / on-line
8. Electric drives with alternating current machines powered from constant voltage sources - Drives with asynchronous machines: starting mode, speed regulation.	- // -	4 hours / on-line
9. Electric drives with alternating current machines supplied from constant voltage sources - Drives with asynchronous machines: electrical braking mode.	- // -	2 hours / on-line
10. Establishing the exam topics.	- // -	2 hours / on-line
Bibliography 1. SPUNEI E., Electric drives - course notes, Reșița 2020. 2. FRANSUA, AL., Electrical machines and drives, Ed. Didactica and Pedagogica, Bucharest, 1989. 3. NOVAC I, a.s. Electrical machines and drives, Ed. Didactica and Pedagogica, Bucharest, 1982. 4. RUJA, I., Acțiunări electrice, Litografia UEM Reșița, 1993. 5. SAAL, C., et.a. Acțiunări electrice și automatizări, Ed. Didactica și Pedagogica, Bucharest, 1980.		
8.2.1. Seminary	Teaching methods	Observation
8.2.2. Laboratory	Teaching methods	Observation
1. Health and safety in laboratory.	Explanation	2 hours / B 3
2. Conventional signs used in electric drives.	Case study, Discussion, Explanation.	2 hours / B 3
3. Drawing up and reading electrical drive diagrams	- // -	4 hours / B 3
4. Experimental determination of the moment of inertia of the rotor of an electric motor.	- // -	2 hours / B 3
5. Starting the DC motor.	- // -	2 hours / B 3
6. Starting of asynchronous motor with short-circuited rotor and asynchronous motor with wound rotor.	- // -	4 hours / B 3
7. Starting the asynchronous motor using the soft-starter	Measurements,	2 hours / B 3

	Discussion, Explanation.	
8. Starting the synchronous motor	- // -	4 hours / B 3
9. Starting the BLDC motor	- // -	2 hours / B 3
10. Evaluation, debt remaining hours.	Case study, Measurements, Discussion, Explanation.	4 hours / B 3
Bibliography 1. SPUNEI E., Electric actuators - laboratory notes, Reșița 2020. 2. RUJA, I., Electric actuators and automation - Laboratory work guide, Lito. UEM, Reșița, 1998. 3. RUJA, I., Electrical actuation and automation - Guide to laboratory work, Lito. UEM, Reșița, 1995.		
8.2.3. Project	Teaching methods	Observation

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	Knowledge of terminology and phenomena related to starting, braking and speed control of electrical drive systems supplied from DC voltage sources	Examination (oral)	70 %
	Knowledge of symbols in electrical drive schemes		
	Explain how a drive system operates on the basis of electrical diagrams and operating characteristics		
10.5.1. Seminary	-		
10.5.2. Laboratory	Understanding the issues addressed at the laboratory	Presentation of the reports	30 %
	Knowledge of how to make different types of windings and electrical connections		
	Ability to use correctly the equipment used for laboratory work		
	Ability to process measurements and draw conclusions from the results		
10.5.3. Project	-		
10.6. Performance Minimum Standard			
<ul style="list-style-type: none"> • Completion of Applicative Activities (laboratory work accomplishment by the minimum grade of 5). • Completion of each exams subject by the minimum grade of 5. 			

Completion Date

Course Coordinator's Signature

Laboratory Coordinator's Signature

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Department Endorsement Date

Chief of Department Signature

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