SYLLABUS

Approved,
DEAN

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 electrical installations**						
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	**C**	2.7. Discipline Regime	**Obt.**

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 /project	**1 / 1**
3.4. Total Hours from the Curriculum Plan	**56**	from which: 3.5. Course	**28**	3.6. laboratory	**14/ 4**
Time Fund Distribution - hours					**69**
Study of Handbook, Course Materials, Bibliography & Notes					**20**
Additional Documentation in Library, on Special E-learning Platforms & in the Field					**9**
Preparation of seminaries/laboratories/ projects, topics, reports, portfolios & essays					**34**
Mentoring					**2**
Examination					**4**
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	• Mathematics, Physics (lighting), Electrical appliances, Electrical Measurements
4.2. of Competences	• Use of PC, measurement of electrical quantities

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	• Students are required to draw up the lighting design in Dialux or another dedicated program and the electrical diagrams in Autocad electrical or another dedicated program. The project will be checked during the semester by the teacher at least twice. The deadline for handing in and supporting the project is in weeks 13 -14 of the semester. Projects that are not handed in and defended by the deadline, or not graded with a minimum grade of 5, will be considered unfinished and will have to be made up.

6. Acquired Specific Competences

Professional Competences	• CP1: Application and appropriateness of specialist knowledge of mathematics, physics, computer science specific to electrical engineering. • CP2: Working with specialist computing and information technology concepts. • 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.
Transversal Competences	• 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. • CT3: Efficient use of information resources and assisted communication and training resources (internet portals, specialised software applications, databases, on-line courses, etc.) both in Romanian and in an international language.

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

7.1. General Objective of Discipline	• Training in the use of the fundamental concepts of industrial electrical installations.
7.2. Specific Objectives	• Training of concepts related to industrial electrical installations and lighting systems; • Training in the ability to measure electrical and photometric quantities, determine lighting factors and maintain industrial electrical systems; • Training the ability to design an electrical lighting and power installation of a consumer, using specialized software.

8. Content

8.1. Course	Teaching methods	Observation
1. Introduction. Electrical installations in industrial consumers. Quality conditions in the supply of electricity to consumers	Presentation; Discussion.	2 hours / on-line
2. Electrical calculation tasks. Methods of determining power requirements. Load curves and indicators.	- // -	2 hours / on-line
3. Transformer substations; classification, structure, sizing and economic operation.	- // -	4 hours / on-line
4. Low-voltage electrical networks, general. Distribution network diagrams. Power supply network diagrams. Characteristics of radial networks.	- // -	4 hours / on-line
5. Protection of low-voltage electrical installations, conditions of provision and selectivity: protection of receivers and circuits.	- // -	2 hours / on-line
6. Column protection. Choice of electrical conductors, determination of conductor cross-section.	- // -	2 hours / on-line
7. Voltage drops and losses. Calculation of short-circuit currents.	- // -	2 hours / on-line
8. Photometric measurements and units. Calculation and measurement of photometric quantities.	- // -	2 hours / on-line
9. Electric light sources. General. Incandescent electric lamps. Gas or metal vapour discharge electric lamps. LED lamps.	- // -	4 hours / on-line
10. Luminaires. Characteristics and classifications of luminaires. Types of luminaires. Quality of artificial lighting.	- // -	2 hours / on-line
11. Establishing the exam topics.	- // -	2 hours / on-line

Bibliography

1. SPUNEI E., Industrial Electrical Installations - Course Notes, Reșița, 2021.
2. PIROI I., Electrical and Lighting Installations, Eftimie Murgu Publishing House, Reșița, 2009.
3. PETER, D.C. Electrical installations - electronic format, http://cee.ubm.ro.
4. PIROI I., Gillich N., Production, transmission and distribution of electricity, Eftimie Murgu Publishing House, Reșița, 2009.
5. IONESCU. T.G. and BACIU. A. Electric distribution networks. Bucharest. Ed. Tehnică. 1981.
6. PETER, D.C. Electrical power distribution installations. Mediamira Publishing House, Cluj-Napoca, 2000.
7. ALBERT, H. Power and energy losses in electrical networks. Technical Publishing House, Bucharest, 1984
8. MOGOREANU, N., Iluminatul electric, Lumina Publishing House, Chisinau, 2013.
9. VATRĂ F., POSTOLACGHE P., POIDA A., Quality of Electricity, Vol I, SIER Publishing House, 2013.
10. VATRĂ F., POSTOLACGHE P., POIDA A., Electricity Quality, Vol II, SIER Publishing House, 2015.
11. *** Standard for the design and execution of electrical installations with voltages up to 1000 V a.c. and 1500 V d.c., I 7/2011.

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
Determination of the demand coefficient and the required power factor by direct analysis method	Case study, Discussion, Explanation.	2 hours / B 4
3. Determination of the total luminous flux of different lighting sources using the Ulbricht lumenmeter. Determination of the efficiency of the analysed lighting sources.	Measurements, Discussion, Explanation.	2 hours / B 4
4. Measurement of illuminance and brightness for different rooms in B-building.	- // -	2 hours / B 4
5. Determination of the lighting-technical factors of the interior lighting systems analysed.	- // -	2 hours / B 4
6. Measurement of illuminance and glare on a roadway or outdoor space. Determination of the lighting factors related to the outdoor lighting systems analysed.	- // -	2 hours / B 4
7. Evaluation, debt remaining hours.	Case study, Measurements, Discussion, Explanation.	2 hours / B 4

Bibliography

1. SPUNEI E., Instalaţii electrice industriale – Note de laborator, Reşiţa, 2021.
2. Barz C. Instalatii electrice – îndrumător de laborator, format electronic, http://cee.ubm.ro.
3. PIROI I., Instalaţii electrice şi de iluminat, Editura Eftimie Murgu, Reşiţa, 2009.
4. PIROI I., Gillich N., Producerea, transportul și distribuția energiei electrice, Editura Eftimie Murgu, Reșița, 2009.
5. *** Normativ pentru proiectarea și executarea instalațiilor electrice cu tensiuni până la 1000 V c.a. și 1500 V c.c., I 7/2011.

8.2.3. Project - **Photometric and dimensional design of a lighting (indoor and outdoor) and power installation for a consumer with an installed power between 7.5÷15 kW, using a computer program.**	Teaching methods	Observation
1. Documentation on lighting spaces and Dialux software	Calculation; Discussion; Questioning.	2 hours / B 4
2. Setting the parameters of the lighting space. Choosing surface colours, placing indoor and outdoor objects.	- // -	2 hours / B 4
3. Choosing sources and luminaires. Calculation of illuminance/lighting and illuminance/lighting uniformity. Graphical representation in plan and space of illumination and brightness	- // -	2 hours / B 4
4. Determination of computing power and absorbed current. Sizing of power supply and choice of switchgear for lighting and power installation.	- // -	2 hours / B 4
5. Drawing up wiring diagrams. Estimated cost estimate for the project. SSM standards.	- // -	2 hours / B 4
6. Evaluation, debt remaining hours.	- // -	2 hours / B 4

Bibliography

1. SPUNEI, E., Assisted design of electrical lighting installations - Project notes, Reșița, 2020
2. PIROI, I. Electrical and lighting installations, Eftimie Murgu Publishing House, Reșița, 2009.
3. BIANCHI, C., et.a. Indoor and outdoor lighting systems - Design, calculation solutions, Ed. Matrix Rom, Bucharest, 2001.
4. MOGOREANU, N., Electrical Lighting, Lumina Publishing House, Chisinau, 2013.
5. MAIER V. et al. Guide for the design of electrical installations in consumers, Ed. U.T. PRESS, Cluj-Napoca, 2013.

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 used in photometry and lighting	Examination (oral)	70 %
	Knowledge of the characteristics of the different types of luminaires and lighting sources		
	Knowledge of the factors defining the		

	quality of lighting systems		
10.5.1. Seminary	-		
10.5.2. Laboratory	Understanding the issues addressed at the laboratory	Presentation of the reports	15 %
	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	Readiness in phrasing the project stages	Technical performance checking of the project final version	15 %
	Project quality		
10.6. Performance Minimum Standard			
• Completion of Applicative Activities (laboratory and project 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

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Laboratory Coordinator's Signature

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Department Endorsement Date

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Chief of Department Signature

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