FIŞA DISCIPLINEI

1. Date despre program

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Electrical Engineering
1.3 Department	Electrotechnics and Measurements
1.4 Field of study	Electrical Engineering
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Electrical System Cluj-Napoca in English language
1.7 Form of Education	Full time
1.8 Subject Code	45

2. Date despre disciplină

2.1 Subject name			Electrical Installations			
2.2 Field of interest			Electrical Installations			
2.3 Course responsible	e/lect	urer	Prof.dr.ing. Sorin Gheorghe Pavel			
2.4 Titular of application	.4 Titular of applications Conf. dr. ing. Horia Beleiu					
2.5 Year of study	Ш	2.6 Semest	ter	2	2.7 Assessment type	Е
Subject category					DS	
2.8 Discipline regime	Opti	onality				DI

3. Estimated total time

3.1 Number of hours per	5	of	3.2	2	3.3		3.3	1	3.3	2
week		which:	Course		Seminar		Laboratory		Project	
3.4 Number of hours per	70	din	3.5	20	3.6		3.6	11	3.6	20
semester	70	care:	Course	20	Seminar		Laboratory	14	Project	28
3.7 Distribution of time fund	(hours	per sem	ester) fo	or:						
(a) Study by textbook, (course	support	, bibliog	raphy	/ and note	es				24
(b) Additional documer	ntation	in the li	brary, oi	n spe	cialized el	lectro	onic platform	is and	l in the	6
field										
(c) Preparation of seminars / laboratories, homework, reports, portfolios and essays								12		
(d) Tutorial										4
(e) Examinations										6
(f) Other activities:										3
3.8 Total of individual study h	nours (sum of								
(3.7(a)3.7(f))) 55										
3.9 Total hours per semester	(3.4+3	3.8)			125					
3.10 Number of credits					5					

4. Pre-requisites (where appropriate)

4.1. Compulsory	Knowledge of Electrical Engineering Basics, Electrical Equipment
4.2. Recommended	No

5. Conditions (where appropriate)

5.1. For the course (where/when)	Multimedia equipment, Electrical Installations companies presentations
5.2.For the applications	 Laboratory and project attendance is mandatory. Knowledge and observance of Labor Safety Standards

6. Specific competences (Learning Outcomes)

nal Competences	• Ability to design, exploit, develop and optimize energy transmission and distribution systems, as well as power supplies for end-users of all types.
	• Ability to apply acquired knowledge about power systems, electrical equipment, operation and maintenance.
	• The design of medium complexity electric power systems, using modern principles for the power systems management.
essic	 The ability to use the latest technical solutions and equipment.
Profe	• Exploitation of technological knowledge for the purpose of designing and exploiting medium complexity power systems.
Competențe transversale	• Applying the values and ethics of the engineer profession and the responsible execution of professional tasks under conditions of limited autonomy and qualified assistance. Promoting logical, convergent and divergent reasoning, practical applicability, assessment and self-assessment in decision-making.
	• Performing activities and exercising the roles specific to teamwork on different hierarchical levels. Promoting the spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and continually improving their own activities.

7.1 General objective of the discipline	Structuring, sizing, realization and operation in economic conditions of medium and low voltage electrical installations, as well as of lighting installations to end-users.
7.2 Specific objectives	 Electrical installations structure to end-users. Methods of calculating the required power, load characteristics. Structure, sizing and exploitation of transformation substations. Low voltage distribution networks, choice of protection devices and electric pipelines for circuits and columns. Electric power organization of low voltage, determination of the distribution panels number. Identify and implement of the economically optimal lighting solutions.

7. Discipline objectives (according to the Specific competences)

8. Contents

8.1 Course (syllabus)	Nr. of hours	Teaching Methods	Notes
1. Electrical installations to end-users; definitions, classifications, composition. Quality conditions in the power supply to end-users.	2		
2. Electrical charges. Methods for determining the demanded power. Load curves and indicators.	2		
3. Transformation substations; classification, structure, sizing and economic functioning	2	Dracantation	
4. Low voltage electrical networks, generalities. Distribution and supplying networks schemes. Radial networks characteristics	2	and	
5. Determining the optimal number of distribution panels. Demand current. Moment of demanded currents.	2	uiscussions	
6. The total moment of the two steps radial network. The peak current.	2		
7. Protection of low-voltage electrical installations, providing and selectivity conditions; protection of receivers and circuits.	2		

8. Column protection. Choosing the electrical conductors; determining the conductor section.	2	
9. Voltage drops. Calculation of Short Circuit Currents.	2	
10. Lighting equipment. Lighting electrical installations, classifications, quality conditions	2	
11. Design of indoor lighting. Location of luminaires, use factor method, predetermination of electrical equipment, computer assisted analysis of solutions, distribution scheme.	2	
12. Design of outdoor lighting installations; solutions predetermination, assisted analysis and economic solution.	2	
13. Reactive power centralized compensation. Dimensioning of capacitor batteries. Reducing the harmonics effect.	2	
14. Protection installations. Design of earthing protection equipment.	2	

References (Bibliography)

- 1. Comşa, D., Darie, S., Maier, V. şi Chindriş, M. Proiectarea instalaţiilor electrice industriale (Design of the industrial electrical installations), Ediţia a II-a. Bucureşti, EDP, 1983, 520 p.
- 2. Maier, V., Pavel, S. G. și Beleiu, H. G. *Instalații electrice la consumatori (Electrical installations at end-users).* Note de curs, în format electronic în pregătire pentru multiplicare (Course notes, in electronic format in preparation for multiplication).
- 3. Maier, V., San Martin, R., Pavel, S.G. şi Manzano, E. *Ghidul centrului de ingineria iluminatului, Iluminatul Exterior (Guide to the lighting engineering center, Exterior Lighting)* Cluj-Napoca: Editura Mediamira, 2000, vol. 3, 118 p.

8.2 Laboratory	Nr. of hours	Teaching Methods	Notes		
1. Prezentarea lucrărilor. Norme specifice de protecție a muncii pentru Instalații electrice: Presentation of papers. Specific norms for work protection in electrical installations.	2		Field		
2. Determination of the demand coefficient and of the demanded power factor using the direct analysis method.	2	Presentation,	conditions,		
3. Capacitor battery for centralized power factor compensation.	2	discussions,	application of		
4. Construction, sizing and measurement of earthing resistances.	2	conclusions	optimal		
5. Construction and characteristics of lighting apparatus.	2		conditions		
6. Characteristics of indoor lighting systems.	2				
7. Lighting system design using the Dialux Program.	2				
8.2.2. Project					
1. Design theme. Tools structure. Receivers characteristics	2				
2. Total installed power of the end-user.	2				
3. Determination of the total demanded power.	2				
4. Choice of transformers from the transformation substation.	2				
5. Emplacement diagram and equivalent load center.	2	Presentation,	Working with		
6. Sizing of receiver circuits.	2	questions	catalogs,		
7.Sizing of machine tools circuits	2	and	norms and		
8. Determination of the distribution panels number and columns dimensioning.	2	discussions	standards.		
9. Transformer cells.	2				
10.Centralized capacitors battery.	2]			
11. Sizing of the indoor lighting system.	2]			
12. Sizing of the outdoor lighting system.	2				

13. Calculation of short-circuit currents and voltage losses.	2	
14. Project delivery and presentation.	2	

References

- Maier, V., Pavel, S.G. şi Rafiroiu, Corina Instalaţii electrice industriale, Lucrări practice (Industrial electrical installations, Applications). Cluj-Napoca: Editura U.T.Press, 2003, 170 p., ISBN 973-662-048-4.
- 2. Maier, V., Pavel, S. G. şi Beleiu, H. G. *Ghid pentru proiectarea instalațiilor electrice la consumatori* (*Guide for the design of end-users electrical installations*). Cluj-Napoca: Editura UTPRESS, 2013, 159 p., ISBN 978-973-662-819-1.

9. Corroborating the discipline contents with the expectations of the epistemic community representatives, the professional associations and the representative employers in the field related to the program.

The courses and applications take into account the requirements and expectations of the business environment: well-known companies in the field, collaborators from industrial and economic environments, colleagues from other university centers.

10. Evaluations

Type of activity	10.1 Accossment criteria	10.2 Evaluations mothods	10.3 Share of			
Type of activity	10.1 Assessment citteria	10.2 Evaluations methods	final mark			
	Understanding criteria and	Written exam (E) – grid,	50%			
10.4 Course	phenomena, engaging in discussions,	applications on aspects				
10.4 COUISE	formulating questions, participating	from the course.				
	in consultations, being able to solve					
	concrete applications.					
	Laboratory activity, conspectus,	Laboratories examination,	17%			
10.5 Laboratory	experimental data processing,	experimental data				
	conclusions.	processing, (mark L)				
	Activity during project	Project verification,	33%			
10 6 Project	implementation, technical solutions	knowledge and different				
10.6 Project	chosen, drawings, knowledge of	stages presentations				
	methodology and norms.	(note P)				
10.7 Minimum performance standard: E, L ≥ 5; P≥6.						
Mark calculation formula N=[3·E+(2P+L)]/6						

Date: sept.2024	Titular	Title First name, Name	Signature
	Course	Prof. dr. ing. Sorin Gheorghe PAVEL	
	Applications	Asoc. prof. dr. ing. Horia BELEIU	

Date of approval in the Department Council	Head of Department:
Electroenergetică și Management	Prof. Eng. MICU Dan Doru, PhD
sept.2024	
	Dean
Date of approval in the Faculty Council	Assoc. Prof. Eng. CZIKER Andrei, PhD
Electrical Engineering	
sept.2024	