

SYLLABUS¹

THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE

1. Information about the program

1.1 Higher education institution	UNIVERSITY POLITEHNICA TIMIȘOARA
1.2 Faculty ² / Department ³	ELECTRICAL AND POWER ENGINEERING / ELECTRICAL ENGINEERING
1.3 Chair	—
1.4 Field of study (name/code ⁴)	ELECTRICAL ENGINEERING / 90
1.5 Study cycle	BACHELOR
1.6 Study program (name/code/qualification)	ELECTROTECHNICS / 30

2. Information about the discipline

2.1 Name of discipline/ formative category ⁵	ELECTROTECHNOLOGIES						
2.2 Coordinator (holder) of course activities	Assoc. Prof. Dr. Eng. Hedeș Alexandru						
2.3 Coordinator (holder) of applied activities ⁶	Assoc. Prof. Dr. Eng. Hedeș Alexandru						
2.4 Year of study ⁷	III	2.5 Semester	6	2.6 Type of evaluation	E	2.7 Type of discipline ⁸	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted)⁹

3.1 Number of fully assisted hours / week	3 of which:	3.2 course	2	3.3 seminar / laboratory / project	1
3.1* Total number of fully assisted hours / semester	42 of which:	3.2* course	28	3.3* seminar / laboratory / project	14
3.4 Number of hours partially assisted / week	of which:	3.5 training		3.6 hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	3.5* training		3.6* hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	3 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			1
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	42 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			14
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week ¹⁰	6				
3.8* Total hours /semester	84				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

¹ The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.

² The name of the faculty which manages the educational curriculum to which the discipline belongs

³ The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

⁴ The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.

⁵ Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).

⁶ Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

⁷ Year of studies in which the discipline is provided in the curriculum.

⁸ Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).

⁹ The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.

¹⁰ The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

4.1 Curriculum	<ul style="list-style-type: none"> Physics; Basics of electrotechnics; Automatic control; Electrical installations
4.2 Competencies	<ul style="list-style-type: none"> that's not the case

5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> video projector room
5.2 to conduct practical activities	<ul style="list-style-type: none"> video projector room, and specific equipment

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none">
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> CP1: The adequate application of basic knowledge of mathematics, physics, and chemistry in the electrical engineering domain; CP2: Performing basic knowledge of computer science and information technology; CP3: Operating with fundamental concepts of electrotechnics; CP4: The analysis, modeling and simulation of electrical systems; CP5: The use of measuring techniques of electrical and non-electrical quantities and of data acquisition systems in electrical systems; CP6: The design of automatic control systems.
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> CT1: The identification of goals, available resources, necessary conditions of the achieved objectives, working stages and timing, deadlines and respective risks; CT2: Pluridisciplinary team tasks and responsibilities highlighting. Relating and efficient work techniques team application; CT3: Information sources, communication resources and computer aided professional education (web portals, domain specific software's, data-bases, on-line courses, etc) both in Romanian and in foreign language.

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	<ul style="list-style-type: none"> practical initiation in the field of electrical engineering
7.2 Specific objectives	<ul style="list-style-type: none"> training of the skills of technical-engineering application of knowledge in fundamental disciplines; - familiarity with the operation of the basic concepts and concepts of electrical engineering; - initiation into the use of specific techniques of analysis, modelling and simulation in electrical engineering; • developing teamwork skills and efficient use of information sources and communication resources

8. Content¹¹

8.1 Course	Number of hours	Teaching methods ¹²
1. General aspects of electrotechnological installations 1.1. Specific terminology. 1.2. Types of electrotechnological processes and equipment. 1.3. General schemes of electrothermal processes and equipment.	4	Use the video projector for teaching and the board for examples and numeric applications.
2. Modeling and simulating electrothermal processes	6	

¹¹ It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".

¹² Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

2.1. Modeling of thermal transfer mechanisms for electrothermal equipment. 2.2. Thermal calculation applications for electrothermal equipment		Teaching is done interactively, by challenging students to debate the subjects taught
3. Processes and equipment of heating and welding by resistance 3.1. Direct resistive heating. 3.2. Indirect heating through resistors. 3.3. Infrared heating. 3.4. Temperature control techniques for resistive heating equipment. 3.5. Resistance welding procedures and equipment	6	
4. Processes and equipment of heating and welding by electromagnetic induction 4.1. Aspects of the interaction of the electromagnetic field over time with fixed body systems. 4.2. Modeling of the inductor-induced technical system with cylindrical geometry and finite dimensions. 4.3. Electrical equipment of induction heating furnaces. 4.4. Processes and equipment of welding by electromagnetic induction.	6	
5. Processes and equipment for arc heating welding 5.1. Electric arc – electrothermal converter and electrical circuit element. 5.2. Electrical equipment of arc furnaces. 3.3. Electric arc welding procedures and equipment.	6	
Bibliography ¹³ 1. A. Hedes – <i>Course notes and applications</i> - in electronic format, made available to students (by group); 2. N. Golovanov, I. Sora, etc., <i>Electroheat and Electrotechnologies</i> , vol. I, "Electrothermiy", Technical Publishing House, Bucharest, 1997 (in Romanian). 3. N. Golovanov, I. Sora, etc., <i>Electroheat and Electrotechnologies</i> , vol. II, "Electrotechnologies", Technical Publishing House, Bucharest, 1998 (in Romanian). 4. A.C. Metaxas, <i>Foundations of Electroheat. A United Approach</i> , John Wiley & Sons, 1996.		
8.2 Applied activities ¹⁴	Number of hours	Teaching methods
1. Standardised elements for the safety of electrothermal equipment	2	Video projector and writing board. Q&A
2. Physico-mathematical and electrical modeling of heat transfer	2	
3. Experimental study of the resistor oven and automatic temperature adjustment	4	
4. Experimental study of arc welding transformers	2	
5. Rotating converter for arc welding	2	
6. Experimental study of induction furnace and frequency ferromagnetic triplor	2	

¹³ At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.

¹⁴ Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".

Bibliography ¹⁵ 1. A. Hedes – "Course notes and applications" - in electronic format, made available to students (by group);

9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

The purpose of the discipline is to train the application side in the field of electrical engineering by:

- - development of the skills of technical-engineering application of knowledge in fundamental disciplines;
- - improvement in the operation with basic notions and concepts of electrotechnics specific to electrotechnologies;
- - the use of specific techniques of analysis, modelling and simulation in the field of electro-technologies;

10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	correct answers	written exam: 3-5 subjects, of which 2-3 theoretical and 1-2 numerical applications	60 %
10.5 Applied activities	S:		
	L: correctness of responses and abilities	laboratory reports and test to verify knowledge and practical skills	40 %
	P¹⁷:		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁸)			
<ul style="list-style-type: none"> • resolution of at least 50% of the content of exam matters 			

Date of completion

15.05.2015

**Head of Department
(signature)**

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**Course coordinator
(signature)**

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**Date of approval in the Faculty
Council ¹⁹**

**Coordinator of applied activities
(signature)**

.....
**Dean
(signature)**

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¹⁵ At least one title must belong to the discipline team.

¹⁶ Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)

¹⁷ In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

¹⁸ It will not explain how the promotion mark is awarded.

¹⁹ The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.