

SYLLABUS¹

THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ² / Department ³	Electrical and Power Engineering / Power 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	Electrical Materials						
2.2 Coordinator (holder) of course activities	Prof. eng. Doru VATAU, PhD						
2.3 Coordinator (holder) of applied activities ⁶	Assist.prof. Mihaela FRIGURA-ILIASA, PhD						
2.4 Year of study ⁷	2	2.5 Semester	3	2.6 Type of evaluation	E	2.7 Type of discipline ⁸	DD

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	4 of which:	3.2 course	2	3.3 seminar / laboratory / project	2
3.1* Total number of fully assisted hours / semester	56 of which:	3.2* course	28	3.3* seminar / laboratory / project	28
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	7				
3.8* Total hours /semester	98				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

4.1 Curriculum	• Physics, 1 st year
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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.

4.2 Competencies	<ul style="list-style-type: none"> General ones
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5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> Students will not attend classes with mobile phones open. Delay of students in the course will not be tolerated as it proves to be disruptive to the educational process.
5.2 to conduct practical activities	<ul style="list-style-type: none"> Students will not attend laboratories with mobile phones open. Delay of students in the laboratory will not be tolerated as it proves to be disruptive to the educational process. The way of carrying out the works is established by the head of the discipline in agreement with the students.

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> C1: Adequate application of basic knowledge of mathematics, physics and chemistry in the field of electrical engineering = 20%; C2: Operating with fundamental concepts in computer science and information technology = 10%; C3: Operation with fundamental concepts in electrical engineering = 10%;
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> CP1: Analysis, modeling and simulation of electrical systems = 15%; CP2: Use of techniques for measuring (electrical and non-electrical) and data acquisition procedures in electrical systems = 10%; CP3: Design of automatic adjustment systems = 5%
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> CT1: Identification of the objectives to be achieved, of the available resources, the conditions for their completion, the working stages, the working times, the accomplishment terms and the afferent risks = 10%; CT2: Identification of roles and responsibilities in a multidisciplinary team and application of relationship techniques and efficient work within the team = 10%; CT3: Efficient use of information sources and resources of communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation = 10%.

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"> The discipline aims to present the phenomena and processes that take place in electrotechnical materials, electrical and non-electrical properties of the main materials used for the construction of machines, appliances and electrical installations, as well as the presentation of modern applications of materials in strong current engineering. During the applicative hours, the electrical characteristics of the electrical insulating, semiconductor, conductive and magnetic materials are studied and determined. We are also studying some high voltage installations used in testing materials.
7.2 Specific objectives	<ul style="list-style-type: none"> Students will acquire skills in correctly understanding the phenomena and processes that take place in materials used for the construction of machines, appliances and electrical installations. The deepening of the theoretical knowledge will be done by solving various problems and by performing some laboratory works.

8. Content¹¹

8.1 Course	Number of hours	Teaching methods ¹²
1. Electrical conductivity. Classification of materials	4	Exposure with the help of the video projector
2. Electrical insulating materials	8	

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.).

3. Semiconductor materials	6	and explanations related to the exposed topics, having discussions on them, students being encouraged to ask questions. The presentation of the course will be made mainly by presenting on the board, all the phenomena and laws specific to the discipline. The course will contain many applications and examples from engineering practice. Students can benefit from electronic materials, too.
4. Conductor materials	6	
5. Magnetic materials	4	

Bibliography ¹³

1. Vătău D., Materiale utilizate în ingineria electrică și energetică, ISBN 978-973-52-1240-7, 209 pagini, Editura Mirton, Timișoara, 2012.
2. Vătău Doru, Frigură-Iliasa Flaviu-Mihai, Elemente moderne de materiale și tehnologii pentru electrotehnică; Editura Orizonturi Universitare, Timișoara, 2003.
3. Ifrim A., Noțingher P., Materiale electrotehnice, Editura Didactică și Pedagogică, București, 1979

8.2 Applied activities ¹⁴	Number of hours	Teaching methods
1. Safety and Emergency Procedures	2	At each laboratory session, practical experiments will be performed, experimental data will be taken, which will be processed and conclusions will be drawn.
2. Knowledge of dielectrics	6	
3. High voltage installations	4	
4. Determination of the electrical characteristics of solid dielectrics	4	
5. Electrical characteristics of semiconductors	4	
6. Testing of electrotechnical oils	4	
7. Determining the characteristics of magnetic materials	4	

Bibliography ¹⁵

1. Chioreanu Vintilă ș.a., Materiale electrotehnice-îndrumător de laborator, Litografia U.P. Timișoara, 2000

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

- Universities where the subject to which this syllabus refers are taught or related disciplines: "Paul Sabatier" University of TOULOUSE, National Polytechnic Institute of GRENoble, National Polytechnic Institute of TOULOUSE.
- The course content and application activities were also discussed with some of the representative employers from the western region of Romania: S.C. AEM S.A., S.C. Elba S.A., S.C. Elster Rometrics S.R.L., Continental Anvelope, S.C. DAR Drăxlmaier Automotive S.R.L. and so on

10. Evaluation

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".

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

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Written exam	The examination consists of dealing with 10 subjects (6 theoretical and 4 applications). Each subject is worth 1 point.	67 %
10.5 Applied activities	S:		
	L: Written tests	There are 4 tests to verify the knowledge acquired in the laboratory. The grade for the activity along the way is obtained by calculating the arithmetic mean of the grades from the 4 tests.	33 %
	P ¹⁷ :		
	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"> • Knowledge of the main physical quantities and their units of measurement that refer to the electrical and non-electrical properties of electrotechnical materials. • How to experimentally determine these physical quantities that appear in the technical data sheets of the materials. • Ability to recognize some samples of solid dielectrics (at least 5 of those presented to the student in the laboratory) 			

Date of completion

Course coordinator
(signature)

Coordinator of applied activities
(signature)

Head of Department
(signature)

Date of approval in the Faculty
Council ¹⁹

Dean
(signature)

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.