SYLLABUS

1. Information about the program

1.1 Higher education institution	UNIVERSITY POLITEHNICA OF TIMISOARA
1.2 Faculty[1]/ Department [2]	ELECTRONICS, TELECOMUNICATON AND INFORMATION TECHNOLOGIES/ BFI
1.3 Field of study (name/code[3])	ELECTRONIC ENGINEERING, TELECOMUNICATION AND INFORMATION TECHNOLOGIES
1.4 Study cycle	License
1.5 Study program (name/code/qualification)	TST-ENG/20/20/10/100/10/TST-ENG

2. Information about the discipline

2.1 Name of discipline/ formative category[4]			Electrical Circuits Analysis and Synthesis/DD				
2.2 Coordinator (holder) of course activities			Marian GRECONICI				
2.3 Coordinator (holder) of applied activities[5]			Marian GRECONICI				
2.4 Year of study[6]	1	**2.5** Semester	2	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [8]

3.1 Number of fully assisted hours / week	4 of which:	**3.2** course	2	**3.3** seminar / laboratory / project	0/2/0
3.1* Total number of fully assisted hours / semester	56 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	0/28/0
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	3.14 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			1.14
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	44 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			16
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week [9]	7.14				
3.8* Total hours /semester	100				
3.9 Number of credits	4				

[1] The name of the faculty which manages the educational curriculum to which the discipline belongs
[2] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[3] The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated.
[4] 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).
[5] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[6] Year of studies in which the discipline is provided in the curriculum.
[7] Discipline may have one of the following regimes: imposed discipline (DI) or compulsory discipline (DOb)-for the other fundamental fields of studies offered by UPT, optional discipline (DO) or optional discipline (Df).
[8] 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.
[9] 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. Prerequisites (where applicable)

4.1 Curriculum	• Calculous, Algebra and Geometry, Physics, Computer Programming, Special Mathematics
4.2 Competencies	• Algebraic calculous, Vector calculous, Integral and differential calculous, Physics concepts

5. Conditions (where applicable)

5.1 of the course	• Classroom, blackboard, projector
5.2 to conduct practical activities	• Specialized laboratory supporting electrical circuits experiments, with voltage and current sources, measurements instruments, specialized software, blackboard

6. Specific competencies acquired through this discipline

Specific competencies	• Selection, synthesis and comparative evaluation of the theoretical concepts,models, techniques and methods in the field of automotive electronics. (C1) • Designing automotive products with dedicated knowledge-based features in Applied Electronics (C4) • Solving typical problems for quality and safety aspects in automotive products (C7)
Professional competencies ascribed to the specific competencies	• Use of fundamentals in terms of devices, circuits, systems, instrumentation and electronics technology.
Transversal competencies ascribed to the specific competencies	• Definition of activity stages and their distribution to subordinates in terms of responsabilities, providing effective exchange of information and interpersonal communication. • Adaptation to new technologies, professional and personal development through continuous training, using printed documentation sources, specialized software and electronic resources in Romanian and at least one 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	• Understand the concepts behind the fundamentals of electrical engineering by using real fundamental applications
7.2 Specific objectives	• Acquiring fundamental knowledge in the field of electrical circuits and practical applications. • Achieving competences in the field of electrical engineering as a ground knowledge for better understanding of the next courses.

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]
Introduction in electrical circuits: electric charge; electric current; potential and voltage drop; power; energy; activ circuit elements; passive circuit elements	6	Slides, discution
D.C. circuits (resistiv circuits: Kirchhoff lows; power in D.C. circuits; linerity and supperposition; source transformation; source transportation; Thevenin's and Nothon's theorem; Nodal and	8	

[10] 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 "(*)".
[11] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

mesh analysis; maximum power transfer theorem		
A.C. circuits: General definitions (instantaneos and r.m.s. value, frequency, period, angular frequency, phase angle); single elements responses to sinusoidal excitation, RLS series circuit; Kirchhoff lows; the phasor methode; Kirchhoff lows in phasor form; power in A.C. circuits; power factor	7	
Fourie analysis: general definitions (r.m.s. value, t.h.d. factor); solving circuits by using the Fouriei analysis; power in permanent steady state	3	
Transient analysis: introduction; the continuity theorems; classical method applied to solve 1st order linear circuits	4	

Bibliography [12] 1. Greconici M., *Electric Circuits – DC and AC steady state*, Ed. Politehnica, 2020, ISBN 978-606-35-0331-3

2. Greconici M., *Fundamente de Inginerie Electrică – Circuite mono și trifazate în regim permanent*, Ed. Orizonturi Universitare, 2006, ISBN 978-606-35-0331-3

3. Sora C., De Sabata I., Bogoevici N., Heler A., Daba D., Vetres I., Radu D., Toader D., Haragus S., Bere I., Titihazan M., Irimia D., Barbulescu E., Blaj C., Greconici M., *Bazele Electrotehnicii*, Ed. Politehnica, 2008, ISBN 978-973-625-587-8

4. A. E. Fitzgerald, D. E. Higgibotham, A. Grabel, *Basic Electrical Engineering*, McGraw-Hill; fifth edition, 1981

5. Charles K. Alexander, Matthew N. O. Sadiku, *Fundamentals of Electric Circuits*, McGraw-Hill; fourth edition, 2009

6. Mahmood Nahvi, Joseph A. Edminister, *Electric Circuits*, Schaum's Outline Series, McGraw-Hill, 2003

7. Tonz R. Kuphaldt, Fundamentals of Electrical Engineering and Electronics, Virtual Institut of Applied Sciense, (VIAS), 2006

8. Greconici M. – Materiale online – campus virtual Course: Fundamente de Inginerie Electrica (upt.ro)

8.2 Applied activities [13]	Number of hours	Teaching methods
D.C. circuits	8	Laboratory materials, circuit building; mesurements; processing the results; numerical simulation of the circuits
A.C. circuits	6	
Answer in the frequency of simple electrical circuits	6	
Numerical analysis of the circuits using p-Spice and Multisim	8	

Bibliography [14] Laboratory works on the virtual campus Course: Fundamente de Inginerie Electrica (upt.ro)

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

- Beasic electrical circuits knowledge are important to understand the next courses

10. Evaluation

[12] 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.
[13] 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".
[14] At least one title must belong to the discipline team.

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Solving a number of 3-4 circuit problems	Two written tests	66%
10.5 Applied activities	**S:**		
	L: Theoretical knowledge; building real circuits and measuring different quantities; result processing; numerical simulations	Short verifications tests	33%
	P[16]**:**		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [17])			
• Determine the equivalent resistance; applying the Kirchhoff lows for solving circuits; calculate a RLC series circuit in A.C. steady state; applying the phasor form for A.C. circuit solving; capability of building (according to the given scheme) of a circuit of medium complexity and the reading the measuring instruments			

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
13.07.2023		
Head of Department (signature)	**Date of approval in the Faculty Council** [18]	**Dean (signature)**
.	14.09.2023	

[15] 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.)

[16] 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.

[17] It will not explain how the promotion mark is awarded.

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