

## COURSE DESCRIPTION

### 1. Program identification information

1.1 Higher education institution	Politehnica University of Bucharest
1.2 Faculty	Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Electrical Engineering Department
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of studies	Bachelor
1.6 Program of studies/Qualification	Technologies and Systems of Telecommunications – TST (English)

### 2. Course identification information

2.1 Name of the course				Fundamentals of Electrical Engineering 1			
2.2 Lecturer				Assoc.Prof. PhD. Eng. Oana Drosu			
2.3 Instructor for practical activities				Assoc.Prof PhD. Eng. Oana Drosu			
2.4 Year of studies	1	2.5 Semester	1	2.6 Evaluation type	Exam	2.7 Course choice type	Compulsory

### 3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week, out of which	5	3.2 course	3	3.3 practical activities	2
3.4 Total hours in the curricula, out of which	70	3.5 course	42	3.6 practical activities	28
Distribution of time					hours
Study according to the manual, course support, bibliography and hand notes					32
Supplemental documentation (library, electronic access resources, in the field, etc)					5
Preparation for practical activities, homeworks, essays, portfolios, etc.					20
Tutoring					0
Examinations					3
Other activities					0
3.7 Total hours of individual study		60			
3.9 Total hours per semester		130			
3.10 Number of ECTS credit points		5			

### 4. Prerequisites (if applicable)

4.1 curricular	Algebra, Calculus, Physics
4.2 competence-based	It is not the case

### 5. Requisites (if applicable)

5.1 for running the course	It is not the case
5.2 for running of the applications	It is not the case

### 6. Specific competences

Professional competences	<p><b>C1.5</b> Theoretical grounding of the characteristics of the designed systems</p> <p><b>C2.1</b> Identifying and describing the structural elements of hardware and communications systems.</p> <p><b>C2.2</b> Explaining the specific steps of the development of hardware and communications systems.</p> <p><b>C5.1</b> Appropriate use of the principles of operation of electronic devices and circuits, as well as methods for measuring electrical quantities</p> <p><b>C5.2</b> Interpretation, design, execution and measurement of the electronic circuit of low / medium complexity.</p>
Transversal competences	Honorable, responsible, ethical behavior within the law in order to ensure the reputation of the profession

### 7. Course objectives (as implied by the grid of specific competences)

7.1 General objective of the course	<p>- <i>For course:</i> To gradually introduce lumped parameter electric circuit theory, from the point of view of its applications in electronics, telecommunications and information technology. To develop students' ability to solve DC and AC circuits, steady state and transient solutions, to understand field assumptions, and electric and magnetic phenomena in capacitors, inductors, transformers and magnetic circuits.</p> <p>- <i>For applications:</i> To master circuit analysis for both linear and nonlinear electric circuits of moderate difficulty.</p>
4.2 Specific objectives	Students will be able to apply basic electric circuit theory, to understand, model and to analyze various circuit problems, to identify and compare their operating regimes, and to observe modelling limits.

### 8. Content

8.1 Lectures	Teaching techniques	Remarks
Circuit elements. Definitions, symbols, rules, constitutive relations, powers.	Teaching is based on oral presentation.	3 hours
Elements of the circuit topology. Kirchhoff's and Tellegen's Theorems.	Expositive and questioning methods are used. Course materials are lecture notes and	6 hours
Linear resistors circuits with uniport elements. Theorems. Analysing methods.		6 hours
Linear resistors circuits with multiport elements (linear		3 hours

controlled sources). Theorems. Analysing methods	presentations, as well as exercise books.	
AC (sinusoidal state) circuits. Complex representation. Conventions.Theorems. Analysing methods.		9 hours
Three-phase circuits.		3 hours
Time-periodic state of linear circuits (non-sinusoidal). Analysing methods.		6 hours
Time-varying state of linear circuits (transient) Analysing methods.		6 hours
8.2 Practical applications	Teaching techniques	Remarks
DC circuits	Oral communication (blackboard)	10 hours
AC circuits.		8 hours
Time-periodic linear circuits.		4 hours
Time-varying state of linear circuits		4 hours
Bibliography <b>O. Drosu</b> , “Circuits Theory: <a href="http://elth.pub.ro/~oanad/cursuri%20online/Circuits/curs">http://elth.pub.ro/~oanad/cursuri%20online/Circuits/curs</a> <b>O. Drosu</b> , “Laplace transform in transient state analysis”: <a href="http://elth.pub.ro/~oanad/cursuri%20online/Circuits/curs">http://elth.pub.ro/~oanad/cursuri%20online/Circuits/curs</a> <b>O. Drosu</b> – BE1 lecture notes <a href="http://www.elth.pub.ro/~oanad/cursuri%20online/curs-ettiBE1/">http://www.elth.pub.ro/~oanad/cursuri%20online/curs-ettiBE1/</a> <b>O. Drosu</b> , “Laplace transform in transient state ”, applications, online la adresa: <a href="http://elth.pub.ro/~oanad/cursuri%20online/Circuits/aplicatii">http://elth.pub.ro/~oanad/cursuri%20online/Circuits/aplicatii</a> F.M.G. Tomescu – Fundamentals of electrical engineering - Electric circuits, Editura Matrix Rom București, 2011. E Cazacu, M. Stanculescu, <i>Bazele electrotehnicii-Teoria circuitelor electrice-Seminar</i> , Editura Matrix Rom București, 2004. E. Cazacu, O. Drosu, G. Epureanu, L.Petrescu „Chestiuni speciale de teoria circuitelor electrice – elemente de teorie și aplicații”, Ed. Matrix-ROM, vol 1, București 2005		

### 9. Bridging the course content with the expectations of the epistemic community representatives, professional associations and employers representatives for the domain of the program

The fundamental nature of the discipline of Electrical Engineering Fundamentals compel the lecturers to keep a close contact with the faculty leadership and with lecturers of the specialized disciplines. In order to complete the content and to choose the teaching / learning methods the lecturers of this discipline have organised specific seminars within the department. During the meetings with relevant personnel from Electronic Engineering field their needs and expectations have been discussed.

### 10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final mark
10.4 Lectures	- Knowledge of basic theoretical notions - Knowledge of the application of theory to specific problems; - Differential analysis	Mid-term exam: 3 subjects (theory and applications) with 10%, 15%, 15% shares, testing students' theoretical knowledge and his ability to give solution to electric circuits problems.	40%

	of techniques and theoretical methods.	Final exam: 3 subjects (theory and applications) with 10%, 15%, 15% shares, testing students' theoretical knowledge and his ability to give solution to electric circuits problems.	40%
10.5 Practical applications	Students' ability to apply theoretical knowledge to solutioning technical problems.	Participating to activity during application classes. Preparing a notebook with problems proposed at homework within seminars.	20%
10.6 Minimal performance standard			
- solutioning simple real problems of electric circuits.			

Date

Lecturer

Instructor for practical activities

25.09.2017

Assoc. Prof. Eng. Oana Mihaela Drosu, PhD



Date of department approval  
25.09.2017

Head of Department,  
Assoc. Prof. Eng. Mihai Maricaru, PhD

