

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF ELECTRONICS ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	2602002	<b>SEMESTER</b>	2
<b>COURSE TITLE</b>	Electric Circuits II		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS (ECTS)</b>	
Lectures	2	4	
Laboratory	2		
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	General Background Course		
<b>PREREQUISITE COURSES:</b>	None		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	YES (in English)		
<b>COURSE WEBSITE (URL)</b>	<a href="http://electronics.teipir.gr/personalpages/vasiliadis/HLEKTRIKA_KYKLWMATA_II/HL_KYKLWMATA_II.html">http://electronics.teipir.gr/personalpages/vasiliadis/HLEKTRIKA_KYKLWMATA_II/HL_KYKLWMATA_II.html</a> <a href="http://electronics.teipir.gr/personalpages/vasiliadis/ERG_HLEKTRIKWN_KYKLWMATWN_2/CIRCUITS_II.html">http://electronics.teipir.gr/personalpages/vasiliadis/ERG_HLEKTRIKWN_KYKLWMATWN_2/CIRCUITS_II.html</a>		

### (2) LEARNING OUTCOMES

#### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Electric Circuits that enable them to:

- Sketch or draw AC electric circuits,
- Analyse these circuits and compute values for currents and voltages,
- Use computational methods suitable for the solution of electric circuits problems,
- Interpret and check the soundness of computation results,
- Analyse application problems that involve electric circuits and assess the realisability of the solutions,

- Collaborate with others and work in a team for the integrated address (analysis and synthesis) of complex AC electric circuits problems, the assessment of alternative solutions and the decision making required.

### **General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Team work*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Production of new research ideas*

*Project planning and management*

*Respect for difference and multiculturalism*

*Respect for the natural environment*

*Showing social, professional and ethical responsibility and sensitivity to gender issues*

*Criticism and self-criticism*

*Production of free, creative and inductive thinking*

*.....*

*Others...*

*.....*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Production of free, creative and inductive thinking

### **(3) COURSE CONTENT**

#### Lectures:

1. AC Voltage and current. Average and Effective value.
2. Introduction to the AC electric circuits.
3. Impedance, simple circuits.
4. Complex numbers, phasors.
5. Circuits' analysis: Mesh-current method I.
6. Circuits' analysis: Node-voltage method.
7. Power: Active, reactive, complex and apparent
8. Power factor
9. Superposition theorem and applications.
10. Thevenin and Norton theorems and applications.
11. Load matching and maximum power transfer theorem
12. Magnetic and coupled circuits, Transformers.
13. Multiphase systems, Introduction to electrical machines

#### Laboratory Experiments:

1. Introduction, safety regulations
2. AC Measurements
3. Use of Oscilloscope.
4. Impedance measurements.
5. Resistor and capacitor series circuit.
6. Impedance and resistor in parallel.
7. Series resonator.
8. Parallel resonator
9. Time constant
10. Transformers
11. Coupled circuits
12. Use of Pspice I

### 13. Use of Pspice II

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b></p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	Face to face lectures														
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b></p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> <li>● Use of electronic presentation with multimedia content in class,</li> <li>● Student support through the course webpage and the departmental e-learning platform,</li> <li>● Electronic communication of instructors and students, through the course webpage and by e-mail.</li> <li>● Use of special circuit simulation software.</li> </ul>														
<p style="text-align: center;"><b>TEACHING METHODS</b></p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<p>Lectures, Laboratory experiments, study.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">Semester workload (hours)</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Study for lectures</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Laboratory experiments</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Report on lab experiments</td> <td style="text-align: center;">26</td> </tr> <tr> <td>Study and preparation for exams</td> <td style="text-align: center;">16</td> </tr> <tr> <td><b>Course Total</b></td> <td style="text-align: center;"><b>120</b></td> </tr> </tbody> </table>	Activity	Semester workload (hours)	Lectures	26	Study for lectures	26	Laboratory experiments	26	Report on lab experiments	26	Study and preparation for exams	16	<b>Course Total</b>	<b>120</b>
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<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final course grade = Lectures part grade x 60% + Laboratory part grade x 40%,</p> <p>Lectures part grade results from: Final written exam on all taught material (100%). The exam includes:</p> <ol style="list-style-type: none"> <li>1. Analysis of a simple circuit,</li> <li>2. Current and voltage dividers,</li> <li>3. Power and power factor computation,</li> <li>4. Thevenin και Norton Equivalent circuits.</li> </ol> <p>Laboratory part grade results from: Written test on each of the lab experiments. Average is used as final lab grade.</p>														

#### (5) ATTACHED BIBLIOGRAPHY

Essential reading

1. Engineering Circuits Analysis, Hayt William H., Kemmerly Jack E., Durbin Steven,
2. Fundamentals of Electric Circuits, Alexander C., Sadiku M.

Recommended Books

1. AC Electric Circuits, A. Drossopoulos, (in Greek)
2. Electric Circuits, Hatzarakis, G., Tziolas Publications (in Greek).
3. Basic circuit theory, Desoer C. A., McGraw Hill.
4. Electric Circuits, Nilson, J.W. and S. A. Riedel, Addison-Wesley.