

Program	59EC – Communications Electronic Engineering B. Eng. 59SC – Telecommunications Systems Engineering B. Eng. 59SO – Sound and Image Engineering B.Eng. 59TL – Telematics Engineering B. Eng.
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Course number and name	
Number	595000004, 595000303, 595000103, 595000203
Name	Circuit Analysis I
Semester	S1 [(September-January)]

Credits and contact hours	
ECTS Credits	6
Contact hours	60

Coordinator's name	Gil Barba, Marta [marta.gil.barba@upm.es]
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Specific course information	
Description of course content	
Study and application of the basic concepts related to the circuit analysis in constant current and in sinusoidal steady-state.	
List of topics to be covered	
1. Basic laws 2. Analysis of resistive circuits 3. Inductive and capacitive elements 4. Sinusoidal steady-state Lab sessions: 1. Multimeter and circuit board 2. Measurements of basic magnitudes in constant current I 3. Measurements of basic magnitudes in constant current II 4. Function generator and oscilloscope 5. Measurements in sinusoidal steady-state 6. Final assessment of the lab work	
Prerequisites or co-requisites	
None	

Specific goals for the course	
Specific outcomes of instruction	
- RA25 – To know the theorem of overaly and multiplication by a constant. Its application to the circuit analysis. - RA26 – To know the Norton's Theorem and Thevenin's Theorem, their	

simplifications and equivalents.

- RA28 – To know the concept of sinusoidal function and its parameters.
- RA49 – To use the overlay theorem to analyze the circuits where different frequency generators appear.
- RA13 – To know and apply the basic laws about the circuit study.
- RA1121 – To know and apply the fundamental theorems of analysis of circuits: overlay, multiplication by a constant.
- RA16 – To analyze the performance of the generators in constant current and their connection current-voltage.
- RA17 – To learn about the different types of generators and the equivalence between them.
- RA15 - To analyze the performance of passive components (resistors, coils and capacitors) and their connection current-voltage.
- RA14 – To analyze circuits in sinusoidal steady-state with constant current.
- RA18 – To learn about the different types of generators and the equivalence between them.
- RA19 – To generalize about the concept of power launched by the active components.
- RA22 – To apply the methods of analysis of a circuit for voltages and currents.
- RA21 – To determine the minimum number of equations needed to analyze a circuit.
- RA32 – To know the use and utility of the circuit board, polimeters, power source, signal generators and oscilloscope.
- RA700 – To express correctly the magnitudes measured in electrical circuits using properly their units.
- RA29 – To do graphic representations of sinusoidal functions.
- RA27 – To know the maximum power transfer theorem and apply it to the other theorems.
- RA48 – To do a full analysis of sinusoidal steady-state circuits.
- RA45 – To establish the concept of impedance.
- RA12 – To link the basic concepts of electromagnetism and electric circuits.
- RA30 – To do calculus of phase change in sinusoidal functions.
- RA44 – To establish the concept of phasor.
- RA50 – To apply Norton's, Thevenin's and the maximum power transfer theorem theorems and the concept of impedance adaptation to the circuit analysis in sinusoidal steady-state.
- RA1122 – To do measurements of current and voltage varying with time.
- RA1123 – To establish the concepts of generated power and consumed power.

Further reading and supplementary materials

- "Fundamentos de circuitos eléctricos". Quinta edición. C. K. Alexander, M. N. O. Sadiku. Ed. McGraw-Hill. 2013/2018
- "Circuitos eléctricos" Séptima edición. J. W. Nilsson, S. A. Riedel. Ed. Pearson Prentice-Hall. 2005
- "Análisis de circuitos en ingeniería". Séptima edición. W. H. Hayt, Jr., J. E. Kemmerly, S. M. Durbin. Ed. McGraw-Hill Interamericana. 2007

- "Análisis básico de circuitos en ingeniería" Sexta edición. J. D. Irwing. Ed. Prentice-Hall.
- Moodle.
- PC, oscilloscope, function generator, multimeter, power supply.