

COURSE SYLLABUS 2019-20

Basic information on the course			
Course:	Circuit theory and electric machines		
Course code:	44102205	Plan:	Grado en Ingeniería Química Industrial (Plan 2010)
Academic Year:	2019-2020	Undergraduate/Graduate:	Graduate
Degree Year:	2	Type:	mandatory
Duration:	First quarter		
TIME DISTRIBUTION ACCORDING TO REGULATIONS			
Credits:	6		
Total time:	150		
USE OF LEARNING PLATFORM:		support for teaching	

TEACHERS			
Name	Gil Montoya, Francisco		
Department	Engineering		
Building	Escuela Superior de Ingeniería		
Office	0.48		
Telephone	+34950214501	E-mail (institutional)	pagilm@ual.es
Website	Web de Gil Montoya, Francisco		
Name			
Department			
Building			
Office			
Telephone		E-mail (institutional)	
Website			
Name			
Department			
Building			
Office			
Telephone		E-mail (institutional)	
Website			
Name			
Department			
Building			
Office			

Telephone		E-mail (institutional)	
Website			

OTHER IMPORTANT INFORMATION

Content justification

Theory of Circuits and Electrical Machines (TCyME) provides training in basic electrical technology that enables the student to develop skills related to the knowledge, planning and development of circuits and electrical installations.

The contents are oriented to the acquisition of generic and specific competences (academic competences) in the field of Industrial Engineering, in Electromechanics and Electrical Technology.

The development of the subject is focused on the student's understanding, theoretically and experimentally, phenomena and processes related to basic aspects of electrical technology (Theory of circuits in direct current, single-phase and three-phase, electrical machines) and basic aspects of energy distribution.

The subject matter is:

Block 0. Introduction. Basic aspects.

Block 1. Single Phase Circuits

Block 2. Three-phase Circuits

Block 3. Transformers

Block 4. Rotating electrical machines, Safety and Lighting.

Courses related in Study Plan

Vector calculation. Differential and integral calculation. Solving system of linear equations and quadratic equations (used in the study of electrical circuits). To know the exponential and logarithmic functions (they are used in the behaviour of circuits in transient regime, RC and RL circuits). Knowledge of fundamental trigonometry. Knowledge and handling of calculation with complex numbers (very important). Know how to apply the fundamental principles of physics.

Pre-required knowledge

Elementary physics. Math for engineers

COMPETENCES

Basic and general competences

Basic competences

General competences

Key competences University of Almeria

- Basic knowledge of the profession

- Ability to solve problems

Specific competences

- CRI4. Knowledge and use of the principles of theory of circuits and electrical machines.
- CT4. Ability to solve problems with initiative, decision making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.
- CT6. Ability to handle specifications, regulations and mandatory standards.

LEARNING OUTCOMES

*To know and analyse the electrical circuits that make up the electrical installations and to know how to apply the resolution methods that allow to know the electrical magnitudes in any part of it. The following will be described main components that are part of the linear electrical circuits, and methods for obtaining the currents, voltages or powers of any load connected to a network or forming part of a smaller installation included in a larger installation. Reached this objective, the student should be able to solve any magnitude in an electrical installation.

*To know and to analyze the electrical networks that supply energy to an industrial installation, obtaining the optimal and/or regulatory dimensions that ensure the good performance of the system. the operation of these networks. It will describe the main methods of resolution of electrical networks, and will resolve the different (real) case studies in terms of their availability and operation. Once this objective has been achieved, the student should be able to dimension any electrical network for power supply to a typical installation.

*To know and understand the operation of the various electrical machines, both rotary and static, which can be presented in a typical installation. The different sets of rotating electrical machines (DC machines, asynchronous machines, synchronous machines, etc.) and (transformers) so that its operating principle, its practical usefulness, the selection criteria for specific applications, the levels of security that they implement and, in short, the needs that involve the use of the same. Once this objective has been achieved, the student should be able to understand how a machine works internally. and could therefore integrate these devices into an installation in an optimal way.

*Knowledge of skills and attitudes present in the performance of the profession. During the course of the course, the knowledge of the following will be promoted professional responsibilities that an engineer has, as well as the implications that derive from the professional exercise (efficiency,

optimization, troubleshooting, etc.). Emphasis will be placed on the need to take a critical stance on the problems to be addressed. the real world, which encourages the creativity of the engineer and results in the search for effective solutions at the lowest cost. As an engineer, you must have an attitude of responsibility, leadership and commitment to work. Once this objective has been achieved, the students should be able to hold management positions in different business areas and should be able to coordinate working groups in multidisciplinary projects. It should also be able to perform professional tasks in the performance of free exercise, either carrying out projects of work and installations or carrying out technical directions.

COMPETENCY ASSESSMENT

Criteria and assessment tools

- 1 Theoretical-practical examination.
- 1 Works developed during the course.
- 1 Active participation in academic sessions.
- 1 Practice exam.
- 1 Practice report.
- 1 Specific work

The evaluation of the different competences (UAL1 and UAL3) will be carried out by means of the evaluation forms:

- * SE8 Tests, exercises, problems;
- * S11 Final assessment of reports, works, projects, etc.;
- * S10 Final tests (written or oral).
- * The SE8 will be valued at 10%.
- * The SE10 will be valued at 70%.
- * The SE11 will be valued at 20%.

Follow-Up Mechanisms

- * Attendance at tutorials
- * Registration and access to the virtual classroom
- * Participation in communication tools (discussion forums, e-mails)
- * Delivery of activities in class
- * Others: Exams and multiple-choice tests

Functional diversity / Functional disability.

- Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (<http://www.ual.es/discapacidad>) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these aforementioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in

charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity, this fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

COURSE MATERIALS

Recommended course materials

- Spanish:
 - Aznar, F.; Espín, A.; Gil, F.. ELECTROTECNIA BÁSICA PARA INGENIEROS . Editorial Universidad de Granada.
 - Fraile Mora, J. ELECTROMAGNETISMO Y CIRCUITOS ELÉCTRICOS. MCgraw hill.
 - Fraile Mora, J. MÁQUINAS ELÉCTRICAS . MCgraw hill.
 - Parra Prieto, V.M. TEORÍA DE CIRCUITOS (2 TOMOS). UNED.
 - Francisco Gil Montoya. Problemas de teoría de circuitos. Universidad de Almería. 2016.
- English:
 - Engineering Circuit Analysis. Steven M. Durbin, William H. Hayt, Jack Kemmerly. McGraw-Hill Education, 2011
 - Fundamentals of Electric Circuits. K. Alexander, Matthew N. O. Sadiku. McGraw-Hill Higher Education, 2007

Complementary

Other materials

Couse materials available in UAL's library

<https://bit.ly/2KOupkL>

WEBSITE

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