

DIE-GITI-312 Electric Machines

SEMESTER: Fall

CREDITS: 7.5 ECTS (5 hrs. per week: 3.5 Theory + 1.5 Lab, on average)

LANGUAGE: Spanish

DEGREES: GITI

Course overview

At the end of the course the students will have a deep knowledge of the different types of electric machines used in power systems: transformers, induction machines and synchronous machines. The subject has a clear experimental approach so that students will also be able to test according to standards the three types of machines.

Prerequisites

Related subjects: Electrotechnics and electromagnetic fields of 2nd year. The theory of the course requires basic knowledge of electromagnetism, ability to solve electrical circuits, and numerical and vector computing capacity. In the lab of the course, basic knowledge of electrical safety, handling of measurement equipment, assembly of electrical diagrams and the preparation of test reports are required. Finally, proper handling of computer applications in engineering is required.

Course contents

Theory:

1. Advanced single-phase and three-phase transformers.
2. Fundamentals of rotating electric machines.
3. The induction machine.
4. The synchronous machine.

Lab:

There will be 9 sessions of 2-hour each session along the course, and will also include a final lab exam.

T1. Routine testing of transformers.

T2. Loading test of three-phase transformers.

T3. Autotransformer.

A1. Routine testing of asynchronous machine.

A2. Loading test of the asynchronous machine working as motor.

A3. Loading test of the asynchronous machine working as generator.

S1. Routine testing of the synchronous machine.

S2. Synchronous machine test as generator in islanding.

S3. Synchronous machine test as generator network connect.

Textbook

- J. Fraile Mora, "Máquinas Eléctricas". 7ª ed., Garceta, Madrid, 2015. ISBN 978-8416228133.

Grading

- Final grade: 70% Theory + 30% Laboratory

- Theory grade (over 100%): 25% follow-up tests (5% short test and 20% inter-semester test), 75% final exam.

- Laboratory (over 100%): 25% tests and reports, 25% theoretical exam and 50% final practical exam. To pass the laboratory requires a minimum grade of 5 in the practical exam. In case of failing the laboratory, the failed parts must be repeated (theoretical exam and / or practical exam).

- To pass the subject requires a minimum grade of 5 in theory and laboratory.