



## Course guides

# 220250 - 220250 - Electrical Power Systems

Last modified: 29/05/2020

**Unit in charge:** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
**Teaching unit:** 709 - DEE - Department of Electrical Engineering.

**Degree:** MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).

**Academic year:** 2020    **ECTS Credits:** 5.0    **Languages:** Catalan

### LECTURER

**Coordinating lecturer:** RAMON MUJAL ROSES.

**Others:**

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

#### Specific:

1. Capability for modeling, analysis, calculation and design of electrical power systems.
2. Ability to calculate and design electrical machines and actuators, with knowledge of efficient electrical systems and efficient control of electrical drives.
3. Ability to project conventional and non-conventionals power facilities.
4. Knowledge to data integration and industrial communications.
5. Knowledge to the management and monitoring of automated information processes energy.
6. Ability to model and solve problems associated with the operation of electric power systems by integrating information technologies and communication: protection, network operation, and electricity market stability.

### TEACHING METHODOLOGY

### LEARNING OBJECTIVES OF THE SUBJECT

### STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	24.00
Hours small group	15,0	12.00
Self study	80,0	64.00

**Total learning time:** 125 h

### CONTENTS

#### (ENG) Mòdul 1. L'electricitat i les seves fonts d'energia

**Full-or-part-time:** 15 h

Theory classes: 3h

Laboratory classes: 2h

Self study : 10h



**(ENG) Mòdul 2. Màquines elèctriques i centres de transformació**

**Full-or-part-time:** 16 h

Theory classes: 3h

Laboratory classes: 3h

Self study : 10h

**(ENG) Mòdul 3. Paràmetres elèctrics i càlcul de xarxes**

**Full-or-part-time:** 17 h

Theory classes: 5h

Laboratory classes: 2h

Self study : 10h

**(ENG) Mòdul 4. Sistemes de Protecció. Posada a terra**

**Full-or-part-time:** 16 h

Theory classes: 3h

Laboratory classes: 3h

Self study : 10h

**(ENG) Mòdul 5. Regulació i control de sistemes elèctrics**

**Full-or-part-time:** 17 h

Theory classes: 5h

Laboratory classes: 2h

Self study : 10h

**(ENG) Mòdul 6. Fallades simètriques en sistemes elèctrics de potència**

**Full-or-part-time:** 16 h

Theory classes: 3h

Laboratory classes: 3h

Self study : 10h

**(ENG) Mòdul 7. Fallades asimètriques. Xarxes de seqüència i components simètriques**

**Full-or-part-time:** 14 h

Theory classes: 4h

Self study : 10h

**(ENG) Mòdul 8. Funcionament econòmic dels sistemes elèctrics**

**Full-or-part-time:** 14 h

Theory classes: 4h

Self study : 10h



## ACTIVITIES

### (ENG) ACTIVITAT 1: PROBLEMES I PRÀCTICA SOBRE MÀQUINES ELÈCTRIQUES

**Full-or-part-time:** 11 h

Theory classes: 3h

Laboratory classes: 2h

Self study: 6h

### (ENG) ACTIVITAT 2: PROBLEMES I PRÀCTICA SOBRE LINIES ELÈCTRIQUES. REGULACIÓ

**Full-or-part-time:** 13 h

Theory classes: 3h

Laboratory classes: 3h

Self study: 7h

### (ENG) ACTIVITAT 3: PROBLEMES I PRACTICA DE L'ANÀLISI DE CORTCIRCUITS EQUILIBRATS

**Full-or-part-time:** 14 h

Theory classes: 5h

Laboratory classes: 2h

Self study: 7h

### (ENG) ACTIVITAT 4: PROBLEMES I PRACTICA DE XARXES DE SEQÜÈNCIA I COMPONENTS SIMÈTRICS

**Full-or-part-time:** 13 h

Theory classes: 3h

Laboratory classes: 3h

Self study: 7h

### (ENG) ACTIVITAT 5. FUNCIONAMENT ECONÒMIC DELS SISTEMES DE POTENCIA

**Full-or-part-time:** 13 h

Theory classes: 5h

Laboratory classes: 2h

Self study: 6h

### (ENG) ACTIVITAT 6: PROBLEMES I PRACTICA DE PROTECCIONS I POSADA A TERRA

**Full-or-part-time:** 13 h

Theory classes: 3h

Laboratory classes: 3h

Self study: 7h

### (ENG) ACTIVITAT 7: CLASSES TEORÍA

**Full-or-part-time:** 48 h

Theory classes: 8h

Self study: 40h



## FINAL REVIEW OF RECOVERY COURSE

### Description:

There will be a test of 1h of duration in which the student must demonstrate that he has reached the level required to recover this subject. For this will be a written test that will be of shorter duration than the examination to which it recovers and of much more basic contents

This basic test will only allow to pass the subject, that is to say, the maximum grade will be of 5.

Only students who do not have the subject approved can be presented to this test.

### Specific objectives:

With this test the student is given the last opportunity to reach the minimum requirements to pass the subject, which would be more basic than in the normal exam, but the maximum grade will also be simply passed (5) or suspended. It is not possible to obtain more note by means of this test than it has been indicated is of minimum contained.

### Material:

The typical material of a written exam. Writing material, calculator and paper

### Delivery:

The written test will be delivered on the same day and at the time of the test, corrected as soon as possible to have a reference note

### Full-or-part-time: 1 h

Theory classes: 1h

## GRADING SYSTEM

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## BIBLIOGRAPHY

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### Basic:

- Stevenson, W.D.; Grainger, J. Análisis de sistemas eléctricos de potencia. 4ª ed. México: McGraw-Hill, 2004. ISBN 9788476534563.
- Porras, A.; Guerrero, A. Seguridad en las instalaciones eléctricas. Madrid: McGraw-Hill, 2000. ISBN 8448127374.
- Mujal Rosas, R.M. Protección de sistemas eléctricos de potencia [on line]. Barcelona: Iniciativa Digital Politècnica, 2014 [Consultation: 08/05/2018]. Available on: <http://hdl.handle.net/2099.3/36676>. ISBN 9788476539729.
- Mujal Rosas, R.M. Cálculo de líneas y redes eléctricas. Barcelona: Iniciativa Digital Politècnica, 2013. ISBN 9788476539866.
- Checa, Luis Mª. Líneas de transporte de energía. 3ª ed. Barcelona: Marcombo Boixareu, 1988. ISBN 8426706843.