

[MGI101] TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

GENERAL INFORMATION

Studies	UNIVERSITY MASTER IN ENERGY AND POWER ELECTRONICS	Subject	THE ELECTRICITY MAINS
Semester	2	Course	1
Character	COMPULSORY	Mention / Field of specialisation	
Plan	2015	Modality	Adapted Face-to-face
Credits	4	Hours/week	2.78
		Language	CASTELLANO
		Total hours	50 class hours + 50 non-class hours = 100 total hours

PROFESSORS

BARRENA BRUÑA, ION ANDONI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

SKILLS

VERIFICA SKILLS

SPECIFIC

MGC26 - Knowing how to model the electric system and calculate power flows and voltages.

MGC27 - Knowing how to analyse the electric power system in the event of failures (symmetrical and asymmetrical) and design suitable protection.

CROSS

MGTR10 - To share knowledge, reasoning and conclusions with specialist and non-specialist audiences in clear, unambiguous ways.

MGTR12 - To analyse complex information and situations in the field of study, considering several solutions for each problem and making the right decision in a given context, taking social and ethical implications into account.

MGTR13 - To identify product or business development opportunities, managing the human and material resources adequately.

BASIC

M_CB10 - To have learning skills and the capacity for self-guided or independent subsequent learning.

M_CB6 - To have and understand knowledge which provides a base or opportunity to be original in the development and/or application of ideas, often in an investigation context

M_CB7 - To know how to apply the acquired knowledge and competencies and the ability to solve problems in new or unfamiliar contexts within wider (or multidisciplinary) environments related to their field of study

M_CB8 - To be able to integrate different types of knowledge and make complex judgements based on information that, in spite of being partial or limited, includes ideas on the social and ethical responsibilities associated with the application of knowledge

M_CB9 - To share knowledge, conclusions and their rationale with specialised and lay audiences in a clear, unambiguous manner

MGTR11 - To lead work teams effectively and efficiently in order to achieve common goals.

LEARNING RESULTS

RMG142 Understanding of the structure and operation of the electric power systems, the operation of the electric pool and the elements that integrate the transmission and distribution lines, the configuration of the substations and all the associated devices

LEARNING ACTIVITIES

Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

Individual and team exercises

Workshops, discussions, seminars, case studies, role plays, etc

CH

NCH

TH

5 h.

5 h.

2 h.

13 h.

15 h.

10 h.

10 h.

EVALUATION SYSTEM

W

Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

100%

MAKE-UP MECHANISMS

Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

Comments: Although it will be tried to carry out the activities and the evaluation in person, it is possible that due to COVID-19 it will have to be switched to an online or blended model.

CH - Class hours: 17 h.

NCH - Non-class hours: 13 h.

TH - Total hours: 30 h.

RMG143 Modelling of electrical power systems and power flow calculations

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Individual study and work, tests and evaluations and check points	2 h.	10 h.	12 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	8 h.		8 h.
Individual and/or team computer simulation practice	2 h.	8 h.	10 h.
Individual and team solving of exercises, problems, and practices	8 h.	2 h.	10 h.

EVALUATION SYSTEM

W

Individual written and oral tests to assess technical skills of the subject	75%
Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices	25%

Comments: Although it will be tried to carry out the activities and the evaluation in person, it is possible that due to COVID-19 it will have to be switched to an online or blended model.

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject
 Reports of solving exercises, case studies, computer practices, simulation practices and laboratory practices

CH - Class hours: 20 h.

NCH - Non-class hours: 20 h.

TH - Total hours: 40 h.

RMG144 To know how to analyze the faults (symetric and asymmetric) on electrical power systems and properly design the protections

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Individual study and work, tests and evaluations and check points	2 h.	9 h.	11 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	5 h.		5 h.
Individual and team solving of exercises, problems, and practices	6 h.	8 h.	14 h.

EVALUATION SYSTEM

W

Individual written and oral tests to assess technical skills of the subject	100%
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Comments: Although it will be tried to carry out the activities and the evaluation in person, it is possible that due to COVID-19 it will have to be switched to an online or blended model.

MAKE-UP MECHANISMS

Individual written and oral tests to assess technical skills of the subject

CH - Class hours: 13 h.

NCH - Non-class hours: 17 h.

TH - Total hours: 30 h.

CONTENTS

1. Introduction to electrical power systems

Structure of electric power systems

Operation of electric power systems (system operator)

Operation of electricity markets

SmartGrids/Distributed generation/DER, etc.

2. Synchronous generator

3. Analysis of power systems

Single line representation of power systems

Per unit values

Admittance model and system calculations

Power flow calculations

4. Power system faults

Symmetrical faults

Symmetric components and sequence networks

Asymmetrical faults

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Presentations by external Lecturers
Computer practical training
Specific Master Software
Topic related web quires

Bibliography

SISTEMAS ELÉCTRICOS DE POTENCIA. Antonio Gómez Expósito.
Pearson Alhambra /978-84-205-3558-6
Análisis de Sistemas de Potencia - John J. Grainger William D.
Stevenson