



Universidad de Jaén

School of Engineering of Jaén

Electric power systems

2024-2025

Grado en Ingeniería eléctrica (E.P.S. Jaén)

Doble Grado en Ingeniería eléctrica e Ingeniería mecánica (E.P.S. Jaén)

Doble Grado en Ingeniería eléctrica e Ingeniería electrónica industrial (E.P.S. Jaén)



CREA



- Acceso Mayores 40
- Guías docentes UJA
- Horarios de tutorías
- Llamamientos PAU
- Movilidad (Coordinador)
- P.O.D.
- Solicitud bilingüismo

Syllabus 2024-25 - 13512021 - Electric Power Systems (Sistemas eléctricos de potencia)

- Caption
- Level 1: Tutorial support sessions, materials and exams in this language
 - Level 2: Tutorial support sessions, materials, exams and seminars in this language
 - Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

Back Full version (Spanish) English

DEGREE: Grado en Ingeniería eléctrica (13512021)
FACULTY: SCHOOL OF ENGINEERING OF JAÉN
DEGREE: Doble grado en Ingeniería eléctrica e Ingeniería mecánica (13612027)
FACULTY: SCHOOL OF ENGINEERING OF JAÉN
DEGREE: Doble grado en Ingeniería eléctrica e Ingeniería electrónica industrial (13712031)
FACULTY: SCHOOL OF ENGINEERING OF JAÉN
ACADEMIC YEAR: 2024-25
COURSE: Electric Power Systems

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Electric Power Systems
CODE: 13512021 (*) ACADEMIC YEAR: 2024-25
LANGUAGE: English LEVEL: 1
ECTS CREDITS: 6.0 YEAR: 4 SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: CANO ORTEGA, ANTONIO
DEPARTMENT: U120 - INGENIERÍA ELÉCTRICA
FIELD OF STUDY: 535 - INGENIERÍA ELÉCTRICA
OFFICE NO.: A3 - A3-229 E-MAIL: acano@ujaen.es P: 953212343
WEBSITE: www.ujaen.es
ORCID: <https://orcid.org/0000-0002-6440-021X>
LANGUAGE: English LEVEL: 1

3. CONTENT DESCRIPTION

Chapter I. Basic Elements of Electrical Power Systems.

Lesson 1. Three-Phase Synchronous Generator.

Lesson 2. The Power Transformer for control purposes.

Lesson 3. Transmission line model and performance.

Chapter II. The Power System in Steady-State.

Lesson 4. The Power Flow problem. Computational algorithms of the Power Flow problem.

Chapter III. The Power System in Transient-States.

Lesson 5. Fault Analysis in Large Power Systems.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

Aggregate groups sessions where the basic theoretical concepts that students should know to comprehend the subject will be explained. In these sessions, simple exercises will be proposed so the foundations of the theory explained can be easily understood. Students should prepare the subject before

hand to take advantage of the theoretical sessions.

Reduced group sessions will have a close follow-up of the students. Skills acquired in the theoretical sessions and the weekly study of the subject will be tested doing works, exercises and simple exams in a daily basis.

There will be five practical sessions in the laboratory wherethe most important concepts explained in the theoretical session will be repeated from a practical point of view.

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

Theoretical exam: theoretical questions and troubleshooting(60%).

Simulation exercise: problem solving using Matlab and Simulink (10%).

Questionnaires: completion of a questionnaire on the contents of each issue of the subject (15%).

Teamwork: simulation of a power system using different Matlab software (15%).

In order to pass the subject, it will be necessary to obtain at least a 5 out of 10 in the written exam.

6. BOOKLIST ([Access the bibliography in the Library catalog](#))

MAIN BOOKLIST:

- Power system analysis. Edition: -. Author: Grainger, John J.. Publisher: New York [etc.]: McGraw-Hill, 1994 ([Library](#))
- Power system analysis. Edition: 3rd ed.. Author: Saadat, Hadi. Publisher: [Estados Unidos] : PSA, cop. 2010 ([Library](#))

ADDITIONAL BOOKLIST:

- Electric energy systems: analysis and operation. Edition: -. Author: -. Publisher: Boca raton : CRC Press, 2009 ([Library](#))
- Introduction to electrical power systems. Edition: -. Author: EL-Hawary, Mohamed E.. Publisher: Piscataway, Hoboken : IEEE Press : John Wiley, 2008
- Power systems analysis. Edition: 2nd. ed. Author: Bergen, Arthur R.. Publisher: New Jersey: Prentice-Hall, cop. 2000 ([Library](#))
- Power system analysis and design. Edition: 5th ed. Author: Glover, J. Duncan. Publisher: Australia: Cengage Learning, 2012 ([Library](#))
- Power system analysis [Recurso electrónico]. Edition: -. Author: Ramana, N. V. Publisher: Noida, India : Pearson, c2011 ([Library](#))
- Power System Modelling and Scripting [Recurso electrónico] . Edition: -. Author: Milano, Federico. Publisher: Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg, 2010. ([Library](#))
- Power system analysis : operation and control. Edition: 3rd ed.. Author: Chakrabarti, Abhijit. Publisher: New Delhi : PHI Learning Private Limited, 2015 ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

Energía asequible y no contaminante

Trabajo decente y crecimiento económico

Industria, innovación e infraestructura

Producción y consumo responsables

Acción por el clima

DETAILED INFORMATION

ODS 4.4 (Increase skills for employment)

ODS 5.B (Improving the use of technology and ICTs)

ODS 7.2 (Scaling up renewable energy) and 7.A (Increasing research and investment in clean energy)

ODS 8.4 (Improving efficient and environmentally friendly production and consumption)

ODS 9 (INDUSTRY, INNOVATION AND INFRASTRUCTURE)

ODS 12.2 (Achieve efficient use of natural resources)

ODS 13.3 (Improving Environmental Education and Awareness)

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

1- TEACHING METHODOLOGY AND TRAINING ACTIVITIES

According to the determination of the Escuela Politécnica Superior de Jaén for the subject of Electrical Power Systems

Theoretical classes in a small group (A1) will be 100% attended by the students as determined by the school, in the assigned classroom and schedule. As for the

Small group classes (A2 - practical), according to the Center's guidelines will be non-rotational in the laboratory and assigned schedules.

The School may vary the percentage of attendance depending on the number of students and the capacity of the classroom/laboratory in accordance with health measures. In case of less than 100% attendance, there will be a periodic rotation of students as determined by the School.

Training Activities	Formato (Face-Face/online) *	Teaching methodology Description
A2 - Small group classes. Practical sessions in specialized laboratories	Face-to-Face 100%	Class to all students in the group at the assigned time and room. Development of 5 practical sessions, two hours each, in laboratories.
A1- Big group exhibition classes Theory sessions on the contents of the program	Face-to-Face 100%	Class to all students in the group at the assigned time and room. Sessions of participatory master classes, in sessions of one or two hours each depending on the timetable of the subject in the classroom.
A1- Big group exhibition classes. Problem solving sessions/exercises	Face-to-Face 100%	They will consist of sessions in the classroom, in sessions of one or two hours each depending on the timetable of the subject carried out in the classroom.
Tutorials	Face-to-Face + <i>Online</i>	Some tutoring sessions will be done face-to-face and others online (synchronous and asynchronous)

2- EVALUATION SYSTEM

The system of evaluation and weights will be the same as in the fully face-to-face scenario determined in this course guide.

3.- RESOURCES

The web page in Ilias of the subject contains the necessary material for the classes:

- Presentations.
 - Problem relations.
 - Practice scripts.
 - Individual activities.
 - Group activities.
 - Additional material that is added during the development of the subject.
- Online books available in the library.

9. VIRTUAL TEACHING SCENARIO

1- TEACHING METHODOLOGY AND TRAINING ACTIVITIES

Large group (A1) theory classes will be online by videoconference at the assigned time. The small group classes (A2 - practices) will be carried out online using videos about the practices complemented with directed activities for each of the practices in the assigned schedules.

Training Activities	Formato (Face-Face/online)	Teaching methodology Description
A2 - Exhibition classes in small group. Practical sessions in specialized laboratories	On line	Replacement of the 5 practical sessions by online training activities with specific free software for the realization of electric power system (synchronous).

A1 - Exhibition classes in Big group. Theory sessions on the contents of the program	On line	Sessions of participatory master classes, in sessions of one or two hours each depending on the timetable of the subject, conducted by videoconference.
A1 - Exhibition classes in big group. Problem solving sessions/exercises	On line	They will consist of online sessions in a synchronous way, in sessions of one or two hours each one depending on the timetable of the subject, carried out by videoconference.
Tutorials	On line	All tutoring sessions will be conducted online (synchronous and asynchronous)

2- EVALUATION SYSTEM

The tests will be conducted online. The weights will be modified to give more weight to the student's work and are distributed as follows:

- Theoretical exam 50%.
- Individual work (academically directed activities) 25%.
- Attendance and participation in class 10%.
- Practice 15%.

3.- SOURCES

The web page in Ilias of the subject contains the necessary material for the classes:

- Presentations.
- Problem relations.
- Practice scripts.
- Individual activities.
- Group activities.
- Additional material that is added during the development of the subject.

Online books available in the library.

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

Rights: You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council www.ctpdandalucia.es

Campus Las Lagunillas s/n | 23071 - Jaén

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