



Universidad de Jaén
School of Engineering of Linares

Fundamentals of electronics

2023-2024

Grado en Ingeniería Química Industrial

Grado en Ingeniería Eléctrica

Grado en Ingeniería Mecánica

Doble Grado en Ingeniería Eléctrica e Ingeniería Mecánica

Doble Grado en Ingeniería de Recursos Energéticos e Ingeniería Química Industrial

CREA



Guías docentes UJA

Horarios de tutorías

Llamamientos PEVAU

Syllabus 2023-24 - 14712010 - Fundamentals of Electronics (Fundamentos de electrónica)

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 (14712010)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Grado en Ingeniería química industrial (14412011)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Doble grado en Ingeniería eléctrica e Ingeniería mecánica (14812013)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Grado en Ingeniería mecánica (14612009)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
DEGREE:	Doble grado en Ingeniería de recursos energéticos e Ing. química industrial (15112011)
FACULTY:	SCHOOL OF ENGINEERING OF LINARES
ACADEMIC YEAR:	2023-24
COURSE:	Fundamentals of Electronics

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Fundamentals of Electronics

CODE: 14712010 (*)

ACADEMIC YEAR: 2023-24

LANGUAGE: English

LEVEL: 1

ECTS CREDITS: 6.0

YEAR: 2

SEMESTER: SC

2. LECTURER BASIC INFORMATION

NAME: CASA CÁRDENAS, JESÚS DE LA

DEPARTMENT: U133 - ING. ELECTRÓNICA Y AUTOMÁTICA

FIELD OF STUDY: 785 - TECNOLOGÍA ELECTRÓNICA

OFFICE NO.: D - 112

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P: 953648672

WEBSITE: www4.ujaen.es/~casacar/ORCID: <https://orcid.org/0000-0001-8014-0051>

LANGUAGE: -

LEVEL: 1

3. CONTENT DESCRIPTION

THEORY

Unit I. Signals, componentes and instrumentation.

Types

of signals. Basic components of electrical circuits (sources, resistors, capacitors, inductors and electrical transformers).

Other components.

Unit II. Semiconductors. Diode and Bipolar Junction Transistor.

Semiconductors.

Flow in semiconductors. Types of semiconductors. The PN junction.

Polarization of the PN junction. Diode. V-I curve of the diode.

Electrical characteristics of the diode. Linearization of the V-I curve of the diode. Basic circuits with diodes. Diode datasheets.

Other diodes. Transistors.

Unit III. Operational Amplifier.

Amplifier

Concept. Voltage amplifier model. Cascade connection of amplifiers. Differential Amplifier concept. The Ideal Operational Amplifier (OA). Linear circuits using Operational Amplifiers. Linear circuits with Op Amp. The real Op Amp.

Unit IV. Digital electronics.**Digital**

signals. Information representation. Representation of integer, natural and real magnitudes. Binary codes. Boolean algebra. Logic gates. combinational functions. True table. Canonical forms of a logical function. Minterms and Maxterms. Logical functions with indifferences. Simplification of logic functions. Karnaugh maps. Simplification of functions using Karnaugh maps. Design of combinational circuits.

PRACTICES**Practical****Unit I. Instrumentation.****Assembly**

of circuits on prototype board. Use of the basic instruments of an electronics laboratory. Realization of measurements.

Practical Unit II. Analog Electronics.**Circuits**

with diodes (assembly and simulation). Circuits with operational amplifiers (assembly and simulation).

Practical Unit III. Digital Electronics.**Design**

and assembly of combinational circuits (assembly and simulation).

This subject is related to the following Sustainable Development Goals (**SDGs**):

- 4. Quality Education.
- 9. Industry, Innovation, and Infrastructure.
- 10. Reduced Inequalities.

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

The **large group expository classes** will consist of introductory activities, lectures, and presentation of theoretical content, including examples that facilitate knowledge acquisition.

The student will be able to follow the exposition of the topics through the material provided beforehand.

The **laboratory activities** will focus on tasks that reflect the knowledge acquired based on the theoretical content.

In this context, collaborative work will be encouraged, as well as the proper communication of the obtained results.

Lastly, **collective tutoring** will be used to address doubts and to monitor the students' learning progress.

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**OVERALL
EVALUATION**

S1. Attendance and participation. The involvement of the student in the development of the classes where they demonstrate the daily work in order to acquire the necessary skills will be valued. The resolution of exercises in English will be especially valued in this section.

S2. Theoretical concepts of the subject. The theoretical contents and their application to solve problems will be evaluated through an exam in the official date.

S3. Carrying out work, cases and exercises. The student's learning progress will be evaluated through continuous evaluation of their ability to project and design electronic circuits with the help of simulations.

S4. Laboratory practices. The student's ability to design and develop electronic circuits will be evaluated through practical assemblies and simulation of electronic circuits.

In the Extraordinary Call 2, the grade of S4 will correspond to the result of the evaluation through a practical exam, as long as S2 has been passed.

It will be necessary to obtain a grade equal to or greater than 5 points in S2 and S4 to carry out the weighted average. The subject will be considered passed if that weighted average is equal to or greater than 5 points. If this is not the case, the grade corresponding to S2 will appear in the minutes.

SINGLE TEST

In compliance with article 13 of the Regulations for the Academic Regime and Assessment of Students of the University of Jaén, any student who justifiably (according to the assumptions contained in the aforementioned article) cannot participate in the regulated and complementary face-to-face activities proposed in subject, you can ask the teaching staff to change the evaluation procedure to a 'single test'.

This request, together with the corresponding justification, must be made at least one week before the start of the examination period.

There will be an exam that will evaluate S2 and another that will evaluate S4, the final grade being that obtained after weighing 50% the result of the evaluation of both exams; To pass the subject, a grade equal to or greater than 5 points must be obtained in each item.

With this system, the CB2, CC5, CT4 and CT6 competencies will be evaluated.

The positive evaluation of the student will imply that he has achieved the learning results Resul-34, Resul-35, Resul-36 and Resul-37.

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

MAIN BOOKLIST:

- Digital design : principles and practices . Edition: 5th. ed. with Verilog. Author: Wakerly, John F. autor. Publisher: Pearson ([Library](#))
- Electronic principles . Edition: 8th ed.. Author: Malvino, Albert Paul.. Publisher: Mc Graw-Hill ([Library](#))

ADDITIONAL BOOKLIST:

- Electronic principles . Edition: 8th ed.. Author: Malvino, Albert Paul.. Publisher: Mc Graw-Hill ([Library](#))

7. VIRTUAL / CLASSROOM TEACHING SCENARIO

TEACHING METHODOLOGY AND TRAINING ACTIVITIES

Formation activities	Format	Teaching Methodology
30 sessions of theoretical teaching in a large group in the classroom, lasting 1 hour.	Face-to-face at 50%.The presence rate may be different, depending on the final number of students.	Master classes in the classroom and broadcast by videoconference, if the technical means allow it, to the rest of the students.Periodic rotation of students.
15 practical teaching sessions in small groups, in the laboratory, lasting 2 hours.	Face-to-face at 50%.The presence rate may be different, depending on the final number of students.	Practical sessions that will include practical assemblies in the laboratory, with student rotation, and simulation of electronic circuits.
Tutoring	Face-to-face and online.	The schedule of each modality will be informed.

EVALUATION SYSTEM

OVERALL EVALUATION			
Evaluation type	Format	Description	Weight
S1. Participation in face-to-face and/or non-face-to-face activities.	Through observation and teacher's notes.	Active participation in class and tutoring activities (collective and individual).	5%
S2. Theoretical concepts of the matter.	Carrying out the exam in person (on the officially established date), as long as the	Examination to assess the theoretical knowledge of the subject	45%

	sanitary distance is respected due to limited capacity.If not possible, the exam would be online.	and its application to problem solving.	
S3. Realization of cases or exercises.	Continuous assessment tests during the teaching period, both synchronous and asynchronous.	Mastery of operational knowledge of the subject.	15%
S4. Practices in lab and use of ICT tools.	Carrying out the exam in person, as long as the sanitary distance is respected due to capacity limitation.	Design and development of practical activities, including practical assemblies and simulation of electronic circuits.	35%
In the Extraordinary Call 2, the grade of S4 will correspond to the result of the evaluation through a practical exam, as long as S2 has been passed.It will be necessary to obtain a grade equal to or greater than 5 points in S2 and S4 to carry out the weighted average. The subject will be considered passed if that weighted average is equal to or greater than 5 points. If this is not the case, the grade corresponding to S2 will appear in the minutes.			

SINGLE TEST*			
Evaluation Type	Format	Description	Weight
S2. Theoretical concepts of the matter.	Carrying out the exam in person (on the officially established date), as long as the sanitary distance is respected due to limited capacity.If not possible, the exam would be online.	Taking an face-to-face exam (if not possible, the exam would be online) to assess the theoretical knowledge of the subject and its application to problem solving.	50%
S4. Practices in lab and use of ICT tools.	Examination of practices in the laboratory.	Design and development of practical activities, including practical assemblies and simulation of electronic circuits.	50%
It will be necessary to obtain a grade equal to or greater than 5 points in S2 and S4 to carry out the weighted average. The subject will be considered passed if that weighted average is equal to or greater than 5 points. If this is not the case, the grade corresponding to S2 will appear in the minutes.			

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This request, together with the corresponding justification, must be made at least one week before the start of the examination period.

RESOURCES

In this scenario, the channels of communication between teachers and students would fundamentally change. The following resources would be used:

Video conference through Google Meet or similar.

Virtual whiteboard using Google Jamboard or similar.

Content repository and discussion forums through the PLATEA or similar teaching platform.

8. VIRTUAL TEACHING SCENARIO

TEACHING METHODOLOGY AND TRAINING ACTIVITIES

Formation activities	Format	Teaching Methodology
30 sessions of theoretical teaching in a large group, lasting 1 hour.	Online and synchronous.	Online master classes
15 practical teaching sessions in small groups, lasting 2 hours.	Online and synchronous.	Practical sessions that will include telematic seminars and simulation of electronic circuits.
Tutoring	Online.	Google Meet or similar.

EVALUATION SYSTEM

OVERALL EVALUATION			
Evaluation type	Format	Description	Weight
S1. Participation in non-face-to-face activities.	Through observation and teacher's notes.	Active participation in class and tutoring activities (collective and individual).	5%
S2. Theoretical concepts of the matter.	Taking the synchronous online exam on the officially established date.	Taking an online exam to assess the theoretical knowledge of the subject and its application to problem solving.	45%
S3. Realization of cases or exercises.	Continuous assessment tests during the teaching period, both synchronous and asynchronous.	Mastery of operational knowledge of the subject.	15%
S4. Practices classes and use of ICT tools.	Online exam	Design and development of practical activities, including simulation of electronic circuits.	35%
<p>In the Extraordinary Call 2, the grade of S4 will correspond to the result of the evaluation through a practical exam, as long as S2 has been passed.</p> <p>It will be necessary to obtain a grade equal to or greater than 5 points in S2 and S4 to carry out the weighted average. The subject will be considered passed if that weighted average is equal to or greater than 5 points. If this is not the case, the grade corresponding to S2 will appear in the minutes.</p>			

SINGLE TEST*			
Evaluation Type	Format	Description	Weight
S2. Theoretical concepts of the matter.	Taking the synchronous online exam on the officially established date.	Taking an online exam to assess the theoretical knowledge of the subject and its application to problem solving.	50%
S4. Practices classes and use of ICT tools.	Online exam	Design and development of practical activities, including simulation of electronic circuits.	50%
<p>It will be necessary to obtain a grade equal to or greater than 5 points in S2 and S4 to carry out the weighted average. The subject will be considered passed if that weighted average is equal to or greater than 5 points. If this is not the case, the grade corresponding to S2 will appear in the minutes.</p>			

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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