

Instrumentation I

Code: 102736
ECTS Credits: 6

| Degree | Type | Year | Semester |
|--|------|------|----------|
| 2500895 Electronic Engineering for Telecommunication | OB | 3 | 1 |

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

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Prerequisites

Basic knowledge corresponding to the subjects of "Components and electronic circuits" and "Analogue electronic amplifiers."

Objectives and Contextualisation

Describe the principles, architectures and limitations of measurement systems. Identify and use different transducers.

Competences

- Communication
- Develop ethics and professionalism.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Perform measurements, calculations, estimations, valuations, analyses, studies, reports, task-scheduling and other similar work in the field of telecommunication systems
- Resolve problems with initiative and creativity. Make decisions. Communicate and transmit knowledge, skills and abilities, in awareness of the ethical and professional responsibilities involved in a telecommunications engineers work.
- Work in a multidisciplinary group and in a multilingual environment, and communicate, both in writing and orally, knowledge, procedures, results and ideas related with telecommunications and electronics
- Work in a team.

Learning Outcomes

1. Assume and respect the role of the different members of a team, as well as the different levels of dependency in the team.
2. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.
3. Contribute to societys welfare and to sustainable development.
4. Design analogue and digital, analogue-digital conversion and digital analogue electronic circuits for telecommunication applications and computing.
5. Develop critical thinking and reasoning.
6. Develop independent learning strategies.
7. Develop the capacity for analysis and synthesis.
8. Maintain a proactive and dynamic attitude with regard to ones own professional career, personal growth and continuing education. Have the will to overcome difficulties.
9. Specify and use electronic instrumentation and measurement systems.
10. Use communication and computer applications to support the development and operation of electronic applications.
11. Work autonomously.
12. Work cooperatively.

Content

Introduction to measurement systems. Sensors and conditioning: basic types of sensors and signal conditioning (

Methodology

The teaching methodology will include, apart from the autonomous work, directed and supervised activities. For t

Activities

| Title | Hours | ECTS | Learning Outcomes |
|---|-------|------|------------------------------------|
| Type: Directed | | | |
| Laboratory classes | 15 | 0.6 | 1, 2, 6, 7, 5, 4, 9, 8, 12, 11 |
| Master classes | 20 | 0.8 | 7, 5, 4, 9 |
| Problems and cases seminars | 15 | 0.6 | 1, 2, 6, 7, 5, 4, 9, 8, 12, 11, 10 |
| Type: Supervised | | | |
| PBL sessions | 10 | 0.4 | 1, 2, 7, 5, 4, 9, 8, 12 |
| Tutorials | 10 | 0.4 | 4, 9 |
| Type: Autonomous | | | |
| Individual study | 20 | 0.8 | 6, 7, 5, 4, 9, 8, 11, 10 |
| PBL oriented work | 20 | 0.8 | 1, 2, 6, 7, 5, 4, 9, 8, 12, 11, 10 |
| Preparation of laboratory work and report writing | 10 | 0.4 | 1, 2, 6, 7, 5, 4, 9, 12, 11, 10 |

| | | | |
|--|----|------|--------------------------------|
| Problem solving and cases activities preparation | 22 | 0.88 | 1, 2, 6, 7, 5, 4, 9, 8, 12, 11 |
| Report writing and preparation of oral presentations | 5 | 0.2 | 1, 2, 12, 10 |

Assessment

Cases

Throughout the semester, cases will be proposed that the student must solve autonomously outside the classroom.

- The cases, together with their follow-up tutorials, are compulsory and will represent 25% of the mark of the subject. The mark will take into account the proposed solution, the report and the evaluation made by the professor during the tutorials.

- Requirement: Having solved all the proposed cases and having a minimum mark of 4.5 in the average of all the individual case-related marks, to be able to do the average with the notes of examination and laboratory.

Keep in mind that the cases are not recoverable and, therefore, if this part is failed, the subject cannot be passed.

Laboratory lessons

- The realization of the laboratory classes is mandatory.

- The mark obtained in the laboratory will constitute 25% of the final mark of the subject.

Requirement: Having attend to all the laboratory classes and have a minimum average mark of 4.5 to pass the subject.

It must be kept in mind that laboratory practices are not recoverable and, therefore, if this part is failed, the subject cannot be passed.

Exams

There will be two partial exams during the semester. The mark of the first partial exam will constitute 66% of the final mark of the exam and the second part the remaining 34%. The mark obtained between the two exams will constitute 50% of the mark of the subject.

Requirement: Minimum mark of 3 in each of the partial exams and 4.5 of average between the two partial exams to pass the subject.

- If the final mark of the partial exams is less than 4,5, or in one of the partial ones it is less than 3, the student can present themselves to the final exam, in which ALL the contents of the subject will be included, provided that the conditions to access this continuous recovery assessment exam are met.

The student can do the final exam whenever he has done the cases and the laboratory which are mandatory in both cases), with a minimum mark of 4.5 each, and at least one partial exam.

In case the mark of one of the partial exams is less than 3, the student must do the final exam.

If the student must take the final exam, a minimum of 4.5 will be required in the mark of this exam to weight its mark with the rest of marks.

For each evaluation activity, a place, date and time of review will be indicated in which the student may review the activity with the professor. If the student does not attend to this review, this activity will not be reviewed later.

Final mark in case of failing.

In case the student does not pass the subject, to determine the final mark that will appear in the student record, the following cases are considered:

1. The student has not attended to any of the partial exams or the final exam. The final mark 'Not evaluable'.
2. He/she has not attended to the final exam, but to one or both partial exams and the average of the partial marks does not reach the minimum mark necessary to weight with the rest of marks. The final mark will be the average of the notes of the partial exams.
3. He/she has attended to the final exam, but the grade is less than the minimum necessary for weighting with the rest of marks. The final mark will be the highest among the average of the partial and final exam marks.
4. The student has attended to one or both of the partial exams and / or the final exam, but has not done the laboratory or the cases (or has failed some of these parts). The final mark of the subject will be that of the failed part (if it has been failed) or a zero (if it has not been done).

Remarks

1. Any other case not included in this regulation will be analyzed individually.

General remarks

1. Notwithstanding other disciplinary measures that are deemed appropriate, and in accordance with the current academic regulations, the irregularities committed by the student who can lead to a variation in the rating of an act of evaluation, as copying or letting copy an exercise or any other evaluation activity will imply failing with a zero, and if it is necessary to pass it, the whole subject will be failed. Qualified evaluation activities by this procedure will not be recoverable, and therefore the subject will be failed directly without opportunity to recover it in the same academic year.

2. The dates of continuous evaluation and delivery of works will be published on the virtual campus and may be subject to possible changes of programming due to adaptation to possible incidents. You will always be informed on the virtual campus about these changes since it is understood that this is the usual platform for the exchange of information between professors and students.

Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|--------------------|-----------|-------|------|---------------------------------------|
| Cases solving | 25% | 0 | 0 | 1, 2, 3, 6, 7, 5, 4, 9, 8, 12, 11, 10 |
| Laboratory lessons | 25% | 0 | 0 | 1, 2, 6, 7, 5, 4, 9, 8, 12, 11, 10 |
| Written exam | 50% | 3 | 0.12 | 2, 7, 5, 4, 9, 11 |

Bibliography

J.C. Alvarez et al., "Instrumentación electrónica", Thomson-Paraninfo, 2006

R. Pallàs-Areny, "Sensores y acondicionadores de señal".

P.H. Sydenham, N.H. Hancock and R. Thorn, "Introduction to Measurement Science and Engineering", John Wiley & Sons, 1989.