

Course guide

330218 - TCO1 - Complementary Technologies I

Last modified: 21/04/2026

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: BACHELOR'S DEGREE IN ICT SYSTEMS ENGINEERING (Syllabus 2010). (Compulsory subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2016). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2016). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2016). (Optional subject).
BACHELOR'S DEGREE IN MINERAL RESOURCE ENGINEERING AND MINERAL RECYCLING (Syllabus 2021). (Optional subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: M. ROSA GIRALT MAS

Others: Busquets Rubio, Pere
Martínez Domene, Juan
Vila Marta, Sebastian

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. Connections of basic aspects of complementary technologies in the ICT environment with the objective of acquiring a broad perspective of the technology applied to engineering.

Transversal:

2. ENTREPRENEURSHIP AND INNOVATION - Level 1. Showing enterprise, acquiring basic knowledge about organizations and becoming familiar with the tools and techniques for generating ideas and managing organizations that make it possible to solve known problems and create opportunities.

3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world's situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

4. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

5. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

6. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

08 GEN. GENDER PERSPECTIVE: An awareness and understanding of sexual and gender inequalities in society in relation to the field of the degree, and the incorporation of different needs and preferences due to sex and gender when designing solutions and solving problems.

TEACHING METHODOLOGY

The subject is a succession of five workshops, two informative sessions and a series of conferences and / or visits to companies, of particular interest for the ICT Systems profile and also for general topics, which can be done optionally. The workshops are activities focused on a very specific objective and are rather instrumental in nature.

The subject is taught in 4 hours per week dedicated mainly to workshops and involves a significant personal workload. The workshops are taught sequentially in time and are self-contained activities. The lectures and optional visits are held during school hours, but outside the hours established for this subject.

LEARNING OBJECTIVES OF THE SUBJECT

After passing this subject the student must:

1. Have a good knowledge at the user level and moderate work agility in the use of the UNIX shell.
2. Acquire dexterity in the use of the usual laboratory instrumentation.
3. Observe and analyze the complex reality of the world from a sustainability perspective.
4. Know how to apply the concept of sustainability to the activities of ICT engineering.
5. Know how to write and structure a document correctly using LaTeX.
6. Demonstrate skill in planning an oral communication, both in the selection of the information to be communicated and in the means used.
7. Solvent use of information resources.

STUDY LOAD

Type	Hours	Percentage
Hours large group	48,0	32.00
Hours small group	12,0	8.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Workshop 1: Laboratory instrumentation

Description:

In this topic we will work on various aspects of the laboratory instruments used in the practices of the different subjects of the degree, such as the oscilloscope, the function generator and the power supply.

Taught by: Joan Martínez

Related activities:

Workshop and directed works.

Full-or-part-time: 6h

Laboratory classes: 6h

Workshop 2: Unix

Description:

In this workshop, the skills, knowledge and skills necessary to work fluently with the UNIX operating system through the shell will be acquired. Orders, standard input / output, pipes, redirects, filesystem, devices, permissions, scripting.

Taught by: Sebastià Vila

Related activities:

Workshop and directed works

Full-or-part-time: 45h

Theory classes: 12h

Laboratory classes: 6h

Self study : 27h

Workshop 3: ICT and sustainability

Description:

This topic will focus on:

- The world's economic, political, social and environmental situation.
- The sustainability paradigm. Concept of sustainable development.
- Globalization: The role of ICT in globalization.
- Environmental economics and global governance.
- ICT and sustainable development.

Related activities:

Workshop and directed works

Full-or-part-time: 40h

Theory classes: 16h

Self study : 24h

Workshop 4: Oral communication

Description:

Communication—both oral and in writing—is a very important aspect of engineers' activities. In this workshop, tools and resources for improving oral communication are given. Techniques and resources for explaining the content so that it is suitable for listeners are presented. Guidelines are given on the use of supporting materials for oral presentations. How to search for information is also worked on.

Taught by: Rosa Giralt

Related activities:

Directed work

Full-or-part-time: 25h

Theory classes: 10h

Self study : 15h

Workshop 5: Latex

Description:

There are different tools for writing documents. In this workshop there will be an introduction to Latex, a tool widely used during the degree for all types of documents.

You will acquire the basic knowledge and skills to use the LaTeX editing system. Types of documents, form, structure of a document, common marks, document processing, Emacs support to work with LaTeX, work with bibliography, tables, figures. I work with LaTeX and subversion.

Taught by: Sebastià Vila

Related activities:

Workshop and directed work.

Full-or-part-time: 20h

Theory classes: 8h

Self study : 12h

ACTIVITIES

Workshop

Description:

Are activities that mix generally short theoretical expositions with tutored exercises, discussions, with the aim that students progress in a particular topic.

Related competencies :

. Connections of basic aspects of complementary technologies in the ICT environment with the objective of acquiring a broad perspective of the technology applied to engineering.

01 EIN N1. ENTREPRENEURSHIP AND INNOVATION - Level 1. Showing enterprise, acquiring basic knowledge about organizations and becoming familiar with the tools and techniques for generating ideas and managing organizations that make it possible to solve known problems and create opportunities.

06 URI N1. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

04 COE N1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

02 SCS N1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world's situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

Full-or-part-time: 120h

Theory classes: 48h

Laboratory classes: 12h

Self study: 60h

Directed works

Description:

The student's objective is to solve small exercises, answer questionnaires or write reports that complement the contents and collaborate with the greater understanding of systems.

Related competencies :

02 SCS N1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world's situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

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06 URI N1. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

Full-or-part-time: 30h

Self study: 30h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

The final grade for the course is obtained from the grades of the different workshops. Optional activities may earn extra points in the final grade. If T_x is the grade of the workshop x , and C the extra points of the optional activities, then the final grade is computed as:

$$N = \min (10, (0.20 T_i + 0.25 T_u + 0.15 T_{co} + 0.15 T_l + 0.25 T_s) + C)$$

Notes:

There will be no final exam, the evaluation will be continuous and will be based exclusively on the grades obtained for each workshop. Some works will require a public presentation of the contents.

Any activity not carried out will be evaluated with 0.

EXAMINATION RULES.

The activities will be carried out following the uses and customs of academic work. Particularly:

1. Plagiarism and other ethically reprehensible behavior are considered singularly serious.
2. Students are obliged to comply with the deadlines, formats and other conditions for submission that are established.

BIBLIOGRAPHY

Basic:

- Xercavins, Josep, i altres. Desarrollo sostenible [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 06/11/2020]. Available on: <http://hdl.handle.net/2099.3/36752>. ISBN 8483018055.
- Apunts propis.

RESOURCES

Other resources:

Sustainability Portal: <http://portalsostenibilidad.upc.edu/> />UNESCO Chair in Sustainability:
<http://tecnologiaisostenibilidad.cus.upc.edu/>