UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Course guide
270163 - EET - Education, Engineering and Technology

Last modified: 30/01/2024

Unit in charge: Barcelona School of Informatics
Teaching unit: 701 - DAC - Department of Computer Architecture.
410 - ICE - Institute of Education Sciences.

Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: DAVID LÓPEZ ÁLVAREZ

Others: Segon quadrimestre:
JOSE FERNÀNDEZ RUZAFA - 10
DAVID LÓPEZ ÁLVAREZ - 10
RAÚL LÓPEZ SÁNCHEZ - 10

PRIOR SKILLS

At a technical level, there are no prerequisites for the subject, but a certain maturity in the vision of the profession is recommended, so students should enroll having completed the first two courses.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CT2.5. To design and evaluate person-computer interfaces which guarantee the accessibility and usability of computer systems, services and applications.
CT3.7. To demonstrate knowledge about the normative and regulation of informatics in a national, European and international scope.
CT8.1. To identify current and emerging technologies and evaluate if they are applicable, to satisfy the users needs.
CT8.2. To assume the roles and functions of the project manager and apply, in the organizations field, the techniques for managing the timing, cost, financial aspects, human resources and risk.
CT8.3. To demonstrate knowledge and be able to apply appropriate techniques for modelling and analysing different kinds of decisions.
CT8.5. To manage and solve problems and conflicts using the capacity to generate alternatives or future scenarios analysed properly, integrating the uncertainty aspects and the multiple objectives to consider.
CT8.6. To demonstrate the comprehension of the importance of the negotiation, effective working habits, leadership and communication skills in all the software development environments.

Generical:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G5. TEAMWORK: to be capable to work as a team member, being just one more member or performing management tasks, with the finality of contributing to develop projects in a pragmatic way and with responsibility sense; to assume compromises taking into account the available resources.
G8. APPROPIATE ATTITUDE TOWARDS WORK: to have motivation to be professional and to face new challenges, have a width vision of the possibilities of the career in the field of informatics engineering. To feel motivated for the quality and the continuous improvement, and behave rigorously in the professional development. Capacity to adapt oneself to organizational or technological changes. Capacity to work in situations with information shortage and/or time and/or resources restrictions.

TEACHING METHODOLOGY

During the course you will learn about various teaching methodologies (actives, master class, gamification, puzzles, ...) and in different formats (face-to-face, online, synchronous and asynchronous, ...) and many materials (slides, videos, notes, exams, ...) and the idea is to experience them all, as a teacher or as a student. In other words, beyond learning the rules of methodology, the people enrolled will experience it, some as teachers and all as students.

LEARNING OBJECTIVES OF THE SUBJECT

1.At the end of the subject, the student will be able to explain the basic principles of education.
2.At the end of the subject, the student will be able to use the different types and educational models related to STEM, in particular with computing in different educational environments
3.At the end of the subject, the student will be able to describe the possibilities, needs and requirements associated with each type of education in the IT environment.
4.At the end of the subject, the student will be able to apply what he or she has learned in the organization, teaching, creation of material and the evaluation of educational activities in the context of technology and informatics.
5.At the end of the subject, the student will be able to adapt the principles, methodologies and educational materials related to IT in activities of any educational level.
6.Al final de la asignatura, el estudiante será capaz de analizar las capacidades mejorar y limitaciones propias en el ejercicio de formador en un entorno STEM, en particular de informática.
7.At the end of the subject, the student will be able to design activities adapted to the needs of each group of learners in a teaching-learning environment in technology and computing.

STUDY LOAD

Type	Hours	Percentage
Hours large group	60,0	40.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Types of education

Description:
- Regulated, non-regular, non-formal, informal training.
- Company and "custom" training
- Product formations
- Requirements to be training staff
- Legislation.

Dimensions and characteristics of the training

Description:
- Face-to-face and non-face-to-face
- Synchronous and asynchronous
- Online and offline.

Sociological and psychopedagogical principles

Description:
- Management of the classroom / course
- Diversity and inclusion
- Type of students
- Social learning environments
- Ethics

Neuroscience

Description:
- Com aprèn el cervell
- Identitat i maduresa emocional i personal
- Funcions cognitives superiors
- Emocions
- Pedagogia i Andragogia

Design of a training

Description:
- Dels objectius al contingut
- Disseny instruccional
- Learning Management Systems

Assessment

Description:
- Principi d'alineament de Biggs
- Tipus d'avaluacions
- Avaluant projectes
- Microcredencials

Interpersonal communication

Description:
- Bases psicològiques de la comunicació
- Empatia i pensament crític
- Treball en equip REAL
- Assertivitat

Communication tools

Description:
- Presentacions orals presencials: pissarra i transparències
- Preparant material escrit: apunts, manuals i exàmens
- Altres materials: vídeos, podcasts, ...

Planification

Description:
- Principis que funcionen: flux, efecte continuarà,...
- Metodologies: de la classe magistral a l¿aprenentatge autònom
- La problemàtics dels cursos asíncrons

Mapping education principles on engineering technology and informàtics education

Description:
- Adequació per objectius
- Model TPACK

Business and product training

Description:
- Tècniques de mercat
- Hands-on
- Certificacions

ACTIVITIES

Instructional design of an educational activity

Description:
In this activity the students will design a training activity taking into account all the steps and components of the instructional design

Specific objectives:
1, 7

Related competencies :
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
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G5. TEAMWORK: to be capable to work as a team member, being just one more member or performing management tasks, with the finality of contributing to develop projects in a pragmatic way and with responsibility sense; to assume compromises taking into account the available resources.

Full-or-part-time: 40h
Practical classes: 16h
Self study: 24h

Analysis and/or design of support material

Description:
In this activity the student will learn the basics of good support material (videos, transparencies, notes,...) will analyze the suitability of some, proposing improvements and/or will design a material.

Specific objectives:
3, 7

Related competencies :
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G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
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Full-or-part-time: 20h
Practical classes: 8h
Self study: 12h

Analysis and/or design of evaluation methods

Description:
In this activity the student will learn different assessment methods, analyzing the best to use in a given educational situation and preparing a proposal.

Specific objectives:
4

Related competencies :
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G5. TEAMWORK: to be capable to work as a team member, being just one more member or performing management tasks, with the finality of contributing to develop projects in a pragmatic way and with responsibility sense; to assume compromises taking into account the available resources.

Full-or-part-time: 20h
Practical classes: 8h
Self study: 12h

Adaptation of an activity to an audience

Description:
In this activity the student will learn the differences between types of teaching and how to adapt the instructional design and the material to different environaments

Specific objectives:
2, 3, 5

Related competencies :
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.
G8. APPROPIATE ATTITUDE TOWARDS WORK: to have motivation to be professional and to face new challenges, have a width vision of the possibilities of the career in the field of informatics engineering. To feel motivated for the quality and the continuous improvement, and behave rigorously in the professional development. Capacity to adapt oneself to organizational or technological changes. Capacity to work in situations with information shortage and/or time and/or resources restrictions.
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Full-or-part-time: 10h
Practical classes: 4h
Self study: 6h

Writing an essay and presenting a theoretical topic

Description:
In this activity, the student will carry out an in-depth research on a subject related to the subject, writting an essay on it and presenting it to the rest of the group.

Specific objectives:
1, 2, 3

Related competencies :
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.
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Full-or-part-time: 40h
Practical classes: 16h
Self study: 24h

Analysis or design of an activity using active methodologies

Description:
In this activity, the student will design a short activity with active methodologies and carry it out in their own class.

Specific objectives:
4, 6, 7

Related competencies :
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G8. APPROPIATE ATTITUDE TOWARDS WORK: to have motivation to be professional and to face new challenges, have a width vision of the possibilities of the career in the field of informatics engineering. To feel motivated for the quality and the continuous improvement, and behave rigorously in the professional development. Capacity to adapt oneself to organizational or technological changes. Capacity to work in situations with information shortage and/or time and/or resources restrictions.
G5. TEAMWORK: to be capable to work as a team member, being just one more member or performing management tasks, with the finality of contributing to develop projects in a pragmatic way and with responsibility sense; to assume compromises taking into account the available resources.

Full-or-part-time: 20h
Practical classes: 8h
Self study: 12h

GRADING SYSTEM

Being a subject related to education, various methodologies, approaches, techniques and tools will be discussed. The teaching method and assessment are consistent with the ideas covered.

The subject does not have a final exam, and is based on developing activities in class, which may include discussions, presentations, preparation of educational material, analysis of educational material (notes, exams, recorded classes, videos, etc.) etc.

A basic, advanced or deep micro-credential will be given for each activity. For example, a topic such as drafting consultation notes, the basic micro-credential will be obtained by understanding the basic rules of drafting (reading an explanatory document or attending the class where it is explained); the advanced microcredential will be obtained by analyzing some notes and the deep credential by making some notes. The number of activities may vary from one course to another.

To pass the subject, each student must have a basic micro-credential for each activity in the subject, at least three advanced and one deep. Once the minimum requirements have been passed, the final grade will depend on the number of advanced and deep micro-credentials obtained following the following formula, where N is the number of activities, A the number of advanced micro-credentials and P the number of deep micro-credentials obtained NF= MIN (10, 5+N*(((A-3)*2+(P-1)*3)/((N-3)*2+(N-1)*3))))

The mark for the transversal competence (communication) does not have a specific weight in the final mark, since this competence is integrated into the course, so it will be very complicated to indicate for each activity which part of the mark is associated with the transversal competence.

BIBLIOGRAPHY

Basic:
- Dierssen, Mara. LA CIENCIA DE LA MEMORIA: El fascinante modo en que nuestro cerebro aprende y recuerda. SHACKLETON BOOKS, ISBN 978-8413612270.
- Garcia Doval, Fatima M.. La educación es otra historia: Usando la historia para comprender mejor la educación actual. Editorial Graó, ISBN 978-8419788757.
- Ruiz Martín, Héctor. ¿Cómo aprendemos? : una aproximación científica al aprendizaje y la enseñanza. 1ª edición. Editorial Graó, de IRIF, S.L., enero 2020. ISBN 978-8418058059.