Course guides
270162 - ASMI - Social and Environmental Issues Of Information Technologies

Unit in charge: Barcelona School of Informatics
Teaching unit: 747 - ESSI - Department of Service and Information System Engineering.
Degree: BACHELOR’S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN DATA SCIENCE AND ENGINEERING (Syllabus 2017). (Optional subject).
Academic year: 2021
ECTS Credits: 6.0
Languages: Catalan

LECTURER

Coordinating lecturer: - Maria Jose Casañ Guerrero (mjcasany@essi.upc.edu)
Others: - Marc Alier Forment (ludo@essi.upc.edu)

PRIOR SKILLS

Interest in computing, its impact and history

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CT3.6. To demonstrate knowledge about the ethical dimension of the company: in general, the social and corporative responsibility and, concretely, the civil and professional responsibilities of the informatics engineer.
CT3.7. To demonstrate knowledge about the normative and regulation of informatics in a national, European and international scope.

General:
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.

TEACHING METHODOLOGY

The specific organization of these 6 credits (four lessons per week in a semester of about 15 weeks useful) would be as follows:

- Two sessions each week, with:
  A two-hour exhibition dedicated to Professor
  B-two hours devoted to student presentations, case studies, exerices and documentaries
LEARNING OBJECTIVES OF THE SUBJECT

1. Ability to analyze the social and environmental impact of science and technology with particular reference to computing and problems of sustainable development.
2. Knowledge about legal issues arising from the use of computing, and the legislation in force and its impact on professionals.
3. Ability to cope with ethical issues and codes of practice in the computing field, the impact of computing on the environment, and the issue of sustainable development in today’s world.
4. Knowing how to make public presentations on the historic, social and environmental aspects of computing.
5. Knowing how to write essays on computing and its social and environmental impact.
6. Ability to study and analyze problems in a critical mood.
7. Ability to critically read texts on computing, its impact and history.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Society and technological change

Description:
1.1 Science and technology
1.2 The process of technological change
1.3 The diffusion of technology
1.4 The technology and its creators
1.5 The organization and technological change

Social aspects of computing

Description:
2.1 The acceleration of technological change and its effects
   - The multiplier factor of ICT
   - Moore’s Law
   - Metcalfe’s law
   - Law of Fracture (Negroponte)
   - Gartner’s hype curve
   - Conway law
2.2 Some social and economic aspects of ICT
   - The future of work
   - Exponential organizations
   - Vigilance Capitalism
   - Social aspects of the application of machine learning algorithms
### ICT’s environmental aspects

**Description:**
3.1 Computers and the Environment  
3.2 The problem of computer waste  
3.3 Computing and sustainability,

### The computing professional: ethics and duties

**Description:**
4.1 The IT profession  
4.2 Why is it important to study ethics?  
4.3 Ethics, moral, culture and values  
4.4 Ethical theories  
4.5 Ethics and professional ethics in computing  
4.6 Deontological codes in computing

### Computing Law: the legislation affecting computing professionals

**Description:**
5.1 Computers and Law: fraud and computer crimes  
5.2 The legal protection of personal data (LPDP)  
5.3 The legal protection of software  
5.4 Laws on Internet (LSSICE)

### General history of computing

**Description:**
6.1 The specificity of the history of computing  
6.2 Historical Background  
   - The mechanical calculators and analogue  
   - Projects of C. Babbage  
   - The tabs  
6.3 The proto-electromechanical computers  
6.4 The first electronic computer: the Von Neumann architecture  
6.5 - The computers of the classical computer  
6.6 - Evolution of technology and software  
6.7 - Mini and micro  
6.8 - History of the Internet  
6.9 - History of artificial intelligence
ACTIVITIES

Development of theme 1: society and technology changes

Description:
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc.), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Specific objectives:
1, 6

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.

Full-or-part-time: 4h 30m
Theory classes: 4h
Guided activities: 0h 30m

Development of theme 2: Social aspects of Computing

Description:
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc.), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Students prepare and study a case study with the help, if necessary, of the teacher, and deliver the answers to questions proposed by the teacher.

Specific objectives:
1, 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. 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.

Full-or-part-time: 18h 30m
Theory classes: 6h
Practical classes: 4h
Guided activities: 0h 30m
Self study: 8h
**Development of Theme 3: Environmental aspects of the infotecnologies**

**Description:**
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc..), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Students prepare and study a case study with the help, if necessary, of the teacher, and deliver the answers to questions proposed by the teacher.

**Specific objectives:**
1, 3, 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.
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.

**Full-or-part-time:** 18h 30m
Theory classes: 6h
Practical classes: 4h
Guided activities: 0h 30m
Self study: 8h

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**Development of item 4: The profession: ethics and professional responsibility**

**Description:**
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc..), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Students prepare and study a case study with the help, if necessary, of the teacher, and deliver the answers to questions proposed by the teacher.

**Specific objectives:**
1, 3, 4, 6

**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.
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.

**Full-or-part-time:** 18h 30m
Theory classes: 6h
Practical classes: 4h
Guided activities: 0h 30m
Self study: 8h
Development of item 5: Computer Law: laws affecting computer professionals

Description:
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc..), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Specific objectives:
1, 2, 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.
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.

Full-or-part-time: 16h 30m
Theory classes: 4h
Practical classes: 4h
Guided activities: 0h 30m
Self study: 8h

Development of item 6: General History of computing

Description:
In the lectures of the professor, students listen respectfully, take notes and ask questions to clarify doubts. In sessions in which some students do presentations, most students follow the same task when there are lectures by teacher; while students who are presenting the subject, had to prepare it, if necessary with help from the teacher, and expose the subject to the class with the aid of some presentation tools (Impress, Powerpoint, etc..), after having prepared also a text summary of the subject (both text and presentation, must be in possession of the teacher with, at least, one day in advance of the meeting presentation).

Specific objectives:
1, 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.
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.

Full-or-part-time: 12h 30m
Theory classes: 4h
Practical classes: 4h
Guided activities: 0h 30m
Self study: 4h
Review of one book about the program

Description:
Reading, study and writing by students

Specific objectives:
1, 5, 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.
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.

Full-or-part-time: 20h 30m
Guided activities: 0h 30m
Self study: 20h

Vision and discussion about some ad hoc documentaries

Description:
Visualization of the documentary, discussion in small groups, writing down each group with the ideas that are highly suggestive or main for the documentary. Each group must present a document delivering the list of the main ideas suggested by the documentary. Individually, each student will submit a document with his critical opinion on the documentary.

Full-or-part-time: 10h
Practical classes: 10h

Study and presentation of a topic in class (group work)

Description:
Students Prepare the subject previously with the help, if necessary, of the teacher and expose the subject in the class by helping with presentation tools (prints, PowerPoint, video, etc.). Previously they must deliver a text with the summary of the subject with the bibliography consulted, a text with the content of the presentation and a 2 or 3 minute video as the main result of the search made (text, presentation, and video must be in possession of the teacher with at least one day in advance of the presentation session in class).

Specific objectives:
1, 4, 5, 6

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.
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.

Full-or-part-time: 20h 30m
Guided activities: 0h 30m
Self study: 20h
**Final exam**

**Description:**
Final exam

**Specific objectives:**
1, 2, 3, 6, 7

**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.

**Full-or-part-time:** 10h
Guided activities: 2h
Self study: 8h

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**GRADING SYSTEM**

The final mark of this course is calculated following one of the next methods:
1) Final Mark = CA
or
2) Final Mark= \( \max(\text{FE},(0.5 \times \text{FE}+0.5 \times \text{CA})) \)

where CA = Continuous Assesment and FE =Final Exam

The CA mark is calculated as follows:
30% - Grade of the work and exhibition of subjects of the program
15% - Grade of book review
25% - Grade of ethical submissions
25% - Grade of other elements susceptible to evaluation: exercises based on videos, cooperative learning work, active participation in the classroom, etc.
5% - grade of the submissions of presentations of other students

To be evaluated by CA (and the final mark is calculated following method 1) Final Mark = CA), a student must have submitted the public exposure work (all partial submissions and presented the exposure work), the ethics submissions (at least 75% of the submissions), the documentation of other elements susceptible of evaluation (at least 75%) and delivered the book review.

In the event that in one of the parts of the continuous asessment the minimum required is not delivered, this part is considered not submitted and the corresponding mark will be zero.

In the case of not following CA, the student will have to do FE. Then, her final mark is calculated using 2), that is, Final Mark= \( \max(\text{FE},(0.5 \times \text{FE}+0.5 \times \text{CA})) \)

Transversal competences are evaluated:
Sustainability and social commitment: based on the specific topics that already exist in the subject on these aspects and, moreover, from the interventions / deliveries in the discussions in class.
Efficient oral and written communication: based on the activities that the student develops:
Written communication: with the book review, the text of the presentations and the rest of the works that can be done optionally.
Oral communication: with the presentations made in class by the students and the quality of the presentation used.
**BIBLIOGRAPHY**

**Basic:**

**Complementary:**