270638 - IAS - Internet Applications and Security

Coordinating unit: 270 - FIB - Barcelona School of Informatics
Teaching unit: 701 - AC - Department of Computer Architecture
Academic year: 2018
Degree: MASTER'S DEGREE IN INNOVATION AND RESEARCH IN INFORMATICS (Syllabus 2012). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Catalan

Degree competences to which the subject contributes

Basic:
CB8. Capability to communicate their conclusions, and the knowledge and rationale underpinning these, to both skilled and unskilled public in a clear and unambiguous way.

Specific:
CEE2.1. Capability to understand models, problems and algorithms related to distributed systems, and to design and evaluate algorithms and systems that process the distribution problems and provide distributed services.

General:
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG4. Capacity for general and technical management of research, development and innovation projects, in companies and technology centers in the field of Informatics Engineering.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, particularly in distributed environments.

Transversal:
CTR4. INFORMATION LITERACY: Capability to manage the acquisition, structuring, analysis and visualization of data and information in the area of informatics engineering, and critically assess the results of this effort.
CTR6. REASONING: Capacity for critical, logical and mathematical reasoning. Capability to solve problems in their area of study. Capacity for abstraction: the capability to create and use models that reflect real situations. Capability to design and implement simple experiments, and analyze and interpret their results. Capacity for analysis, synthesis and evaluation.

Teaching methodology

The course is very interactive with some introductory topics from the Professor and a few assignments in which students present papers and discuss conclusions.

In particular, students prepare two assignments for analysis and discussion on topics of recent research and standards, and another one more on research.

In the first two assignments, students present the results of their analysis and lead a discussion on this with rest of students.

In the last one, students make a small research project led by the Professor (on a specific topic: what is done? what is not solved? ideas to solve it). They write a short paper and make a presentation where they answer questions and criticisms from the Professor and the other students.

Learning objectives of the subject

1. Standards
2. Internet multimedia applications
### Study load

<table>
<thead>
<tr>
<th>Study load</th>
<th>Duration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time</strong></td>
<td>150h</td>
<td></td>
</tr>
<tr>
<td>Theory classes:</td>
<td>24h</td>
<td>16.00%</td>
</tr>
<tr>
<td>Practical classes:</td>
<td>12h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>12h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>96h</td>
<td>64.00%</td>
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</tbody>
</table>
## Introduction

**Degree competences to which the content contributes:**

**Description:**
- Subject introduction
- Application layer
- Web: HTTP
- XML (eXtensible Markup Language)
- Standardization

## Security in applications

**Degree competences to which the content contributes:**

**Description:**
- Threads and mechanisms
- Cryptography
- PKI (Public Key Infrastructure)
- Security in application protocols
- XML and security: Encryption, Signature
- Specific security protocols: SAML, OAuth
- Internet applications privacy
- Intellectual rights for multimedia content
- Security and privacy in eHealth
- New approaches: Blockchain, Quantum security, ...

## Multimedia content

**Degree competences to which the content contributes:**

**Description:**
- Market aspects.
- Life cycle.
- Content architectures.
- Content types: Characters, Audio, Images, Video.
- Metadata.

## Multimedia content transmission

**Degree competences to which the content contributes:**

**Description:**
- HTML5 support to multimedia transmission.
- Streaming protocols.
- Streaming with HTTP.
- DASH.
- Content Delivery Networks (CDN).
## Planning of activities

<table>
<thead>
<tr>
<th>Development of topic 1</th>
<th>Hours: 12h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 6h</td>
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</table>

Specific objectives: 1, 2

<table>
<thead>
<tr>
<th>Development of topic 2</th>
<th>Hours: 20h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
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<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

Specific objectives: 1, 3

<table>
<thead>
<tr>
<th>Development of topic 3</th>
<th>Hours: 8h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 4h</td>
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</tbody>
</table>

Specific objectives: 1, 2

<table>
<thead>
<tr>
<th>Development of topic 4</th>
<th>Hours: 8h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
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<tr>
<td></td>
<td>Practical classes: 0h</td>
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<td></td>
<td>Laboratory classes: 0h</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
<td></td>
<td>Self study: 4h</td>
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Specific objectives: 1, 2
Presentations and discussion students' assignments

Specific objectives:
1, 2, 3

Hours: 102h
- Theory classes: 24h 36m
- Practical classes: 0h
- Laboratory classes: 0h
- Guided activities: 0h
- Self study: 77h 24m

Qualification system

Test on the topics developed by the Professor (T).
2 assignments on analysis and discussion (A) and 1 assignment on research (R).
(A) Analysis & Discussion of a document. Students provide documentation + short presentation and lead class discussion. Students not presenting should make questions showing their understanding of the topics.
(R) Research work. Students provide documentation + "long" presentation + interview (if needed).
Final mark: (T * 0,3) + 2* (A * 0,2) + (R * 0,3)
Assessment of A includes:
- Content (35%), Presentation (30%), Lead discussion (20%), Others' discussion (15%).
Assessment of R includes:
- Content (35%), Presentation (25%), Questions (15%), Report (25%).
T mark could be increased (factor F) with the evaluation of n (number to define) "dairy short tests" (mark D for every dairy test):
Increase factor (F) = 0,25 * ( Σn Di )/ n
The increased T mark would be: T * (1+F). 0 <= F <= 0,25.

Bibliography

Basic: