Course guide
270501 - ISDCM - Internet, Security and Multimedia Contents Distribution

Last modified: 03/02/2025

Unit in charge: Barcelona School of Informatics
Teaching unit: 701 - DAC - Department of Computer Architecture.

Degree: MASTER'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2012). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JAIME M. DELGADO MERCE

Others: Segon quadrimestre:
JAIME M. DELGADO MERCE - 11, 12
SILVIA LLORENTE VIEJO - 11, 12

PRIOR SKILLS

Java programming.
Basic computer networks concepts.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CTE1. Capability to model, design, define the architecture, implement, manage, operate, administrate and maintain applications, networks, systems, services and computer contents.
CTE12. Capability to create and exploit virtual environments, and to the create, manageme and distribute of multimedia content.
CTE2. Capability to understand and know how to apply the operation and organization of Internet, technologies and protocols for next generation networks, component models, middleware and services.
CTE4. Capability to design, develop, manage and evaluate mechanisms of certification and safety guarantee in the management and access to information in a local or distributed processing.

Generical:
CG1. Capability to plan, calculate and design products, processes and facilities in all areas of Computer Science.
CG2. Capacity for management of products and installations of computer systems, complying with current legislation and ensuring the quality of service.
CG3. Capability to lead, plan and supervise multidisciplinary teams.
CG6. Capacity for general management, technical management and research projects management, development and innovation in companies and technology centers in the area of Computer Science.
CG7. Capacity for implementation, direction and management of computer manufacturing processes, with guarantee of safety for people and assets, the final quality of the products and their homologation.

Transversal:
CTR3. TEAMWORK: Capacity of being able to work as a team member, either as a regular member or performing directive activities, in order to help the development of projects in a pragmatic manner and with sense of responsibility; capability to take into account the available resources.
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.

TEACHING METHODOLOGY

This course should give an overview and the most technically and practically possible view of the problems and solutions to the development of Internet secure multimedia applications. Although, as it covers many topics, there is an important descriptive approach, the subject is organised from a practical point of view with many use cases and laboratory practices.

For this reason, the teaching methodology will use examples and problems to introduce the concepts to help students to attain the skills needed. Also, we will try to encourage interaction with students considering real situations to discuss their possible solutions.

On the other hand, the laboratory practices will complete the skills and knowledge acquired in theory / problems classes. Practices will have an integrating perspective (project type) since students will built small modules. Some of them will be intergrated.

LEARNING OBJECTIVES OF THE SUBJECT

1.Design of multimedia applications and tools.
2.Security in Internet and its applications.

STUDY LOAD

Type	Hours	Percentage
Hours small group	18,0	12.00
Self study	96,0	64.00
Hours large group	36,0	24.00

Total learning time: 150 h

CONTENTS

Distributed applications design

Description:
Application layer formats and protocols. HTML. XML. HTTP-based applications and services design. Distributed applications and remote operations. Web applications. Web services. WSDL, SOAP and REST.

Multimedia content representation

Description:
Multimedia content software market. Life cycle. Content architectures. Content types. Characters. Audio. Images. Video. Structures and containers. Metadata.

Multimedia content transmission

Description:
HTML5 support to multimedia transmission. Streaming protocols. Streaming with HTTP. DASH.

Internet security

Description:
1. Threats and security mechanisms.
2. Private key and public key. Algorithms for public key. Digital signature.
3. Public Key Infrastructure. Trust models.
4. Security in applications: XML Encryption, XML Signature. SAML, JWT, OAuth. Privacy. Intellectual property rights of multimedia content. Access control. Security and privacy in specific areas (eHealth, ...).

ACTIVITIES

Theme 1 development

Specific objectives:
1

Related competencies :
CTE12. Capability to create and exploit virtual environments, and to the create, manageme and distribute of multimedia content.
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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.

Full-or-part-time: 31h
Theory classes: 11h
Self study: 20h

Theme 2 development

Specific objectives:
1

Related competencies :
CTE12. Capability to create and exploit virtual environments, and to the create, manageme and distribute of multimedia content.
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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.

Full-or-part-time: 17h
Self study: 10h 30m
Theory classes: 6h 30m

Theme 3 development

Specific objectives:
1

Related competencies :
CTE12. Capability to create and exploit virtual environments, and to the create, manageme and distribute of multimedia content.
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CG1. Capability to plan, calculate and design products, processes and facilities in all areas of Computer Science.
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CTR3. TEAMWORK: Capacity of being able to work as a team member, either as a regular member or performing directive activities, in order to help the development of projects in a pragmatic manner and with sense of responsibility; capability to take into account the available resources.
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.

Full-or-part-time: 17h
Theory classes: 6h 30m
Self study: 10h 30m

Theme 4 development

Specific objectives:
2

Related competencies :
CTE2. Capability to understand and know how to apply the operation and organization of Internet, technologies and protocols for next generation networks, component models, middleware and services.
CTE4. Capability to design, develop, manage and evaluate mechanisms of certification and safety guarantee in the management and access to information in a local or distributed processing.
CG7. Capacity for implementation, direction and management of computer manufacturing processes, with guarantee of safety for people and assets, the final quality of the products and their homologation.
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.

Full-or-part-time: 43h 30m
Self study: 27h
Theory classes: 16h 30m

Laboratory practices

Description:
During the course, a project will be done in the lab sessions in small groups. The project aims to develop a web application that will integrate the concepts of the subject.
The project breaks down into three phases of two sessions each, covering topics such as web applications, web services and security. Each session corresponds to a delivery which is evaluated independently. The work performed on the project is incremental, since deliveries depend on the previous ones so as to achieve a more complete functionality.

Specific objectives:
1, 2

Related competencies :
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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.

Full-or-part-time: 41h 30m
Laboratory classes: 13h 30m
Self study: 28h

GRADING SYSTEM

2 partial exams (P1, P2). P1 includes topics 1 to 3; P2 includes the rest.
1 assignment that includes presentation, discussion and documentation.
Laboratory (L): Several deliverables.
Final exam not mandatory (F) with two parts (F1, topics 1 to 3, and F2, rest of topics).
Weekly "mini-tests" that increment the mark of the partial exams (Incr)
Grade: (Nt * 0.4) + (Na * 0.25) + (Nl * 0.35), given that Nt=>3.5 (no pass on the contrary); Nt is the grade for theory, Na for the assignment and Nl for laboratory.
Nt = MAX (Nt partial exams, Nt with final exam)
Nt partial exams = (P1+P2)/2 * Incr, where Incr = 1 + 0.02 * (ADDITION (tests grades) / Number of tests)
Nt with final exam = 0.5 * MAX (P1, F1) + 0.5 * MAX (P2, F2)
Nl = (Deliverables grade * 0.5) + (Interviews grade * 0.5)
Na = (0.3 * Content) + (0.2 * Report) + (0.3 * Presentation) + (0.1 * Discussion) + (0.1 * Participation)

BIBLIOGRAPHY

Basic:
- Delgado, J. Slides.
- Delgado, J. Exercises.