Course guide
804126 - AWUGII - Latest Generation Web Applications II

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.
Degree: BACHELOR’S DEGREE IN MULTIMEDIA STUDIES (Syllabus 2009). (Compulsory subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: English

LECTURER

Coordinating lecturer: Sole Pareta, Josep
Others: Mindan Seuba, Pere Joaquim Careglio, Davide

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Analyse the evolution of web applications, the state of the art and associated devices in state-of-the-art web applications. Related to CET19.
2. Apply structures and techniques related to the design of graphical user interfaces according to new content and formats of state-of-the-art web applications. Related to CET19.
3. Apply theoretical and practical knowledge related to user-centred design, ease of use and accessibility to the development of state-of-the-art web applications. Related to CET21.
4. Apply new theoretical and practical knowledge related to the technologies used in the development of state-of-the-art web applications.

Transversal:
5. SELF-DIRECTED LEARNING. Detecting gaps in one’s knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one’s knowledge.
6. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
7. ENTREPRENEURSHIP AND INNOVATION: Knowing about and understanding how businesses are run and the sciences that govern their activity. Having the ability to understand labor laws and how planning, industrial and marketing strategies, quality and profits relate to each other.
8. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.
9. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

TEACHING METHODOLOGY

Classes are divided, in general, into 3 types.
1. Realization, explanation and discussion of the exercises during the previous session and resolution of doubts about them.
2. Exhibition activity directed by the teacher to introduce new knowledge (topics).
3. Explanation of next year and the supplementary materials.
These activities are modulated according to the complexity of the exercises and the corresponding content.
LEARNING OBJECTIVES OF THE SUBJECT

1. To know the evolution of web applications, the state of the art and the devices associated with the latest generation web applications.
2. Plan and use the information needed for an academic work based on a critical reflection on the information resources used.
3. Take into account the social, economic and environmental dimensions when applying solutions and carry out projects consistent with human development and sustainability.
4. Communicate clearly and efficiently in oral and written presentations adapted to the type of audience and the objectives of the communication using the appropriate strategies and means.
5. (Part 1 only) Acquire knowledge of the network architecture and protocols of computer networks that support Internet Multimedia Applications.
6. (Part 1 only) Consolidation of laboratory knowledge specifically related to multimedia protocols and applications.
7. (Only in Part 1) Preparation of questions (appropriate to the level of knowledge explained in class) with their corresponding answers to promote comprehensive learning and encourage the ability to abstract concepts and knowledge.
8. (Part 2 only) Develop graphical user interfaces in accordance with the new content and formats of state-of-the-art web applications.
9. (Part 2 only) Design and program state-of-the-art web applications.
10. (Part 2 only) Plan and develop the user-centric state-of-the-art web design process.
11. (Part 2 only) Take into account the social, economic and environmental dimensions when implementing solutions and carrying out projects consistent with human development and sustainability.
12. (Only in Part 2) Apply the knowledge acquired in carrying out a task according to its importance, deciding how to carry it out and the time required to devote, selecting the sources of information more appropriate.
13. (Part 2 only) Plan and use the information needed for an academic paper based on a critical reflection on the information resources used.
14. (Part 2 only) Communicate clearly and efficiently in oral and written presentations tailored to the type of audience and the objectives of the communication using appropriate strategies and means.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>60,0</td>
<td>40.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

Chapter 1. Introduction to Part 1

Description:
- Reminding the TCP/IP architecture and protocols learned in ASXI
- Introduction to some relevant concepts for the Part 1 of AWUG II

Related activities:
Lab 1: P01: Preparation of a VM and configuration of a DHCP server
- All the practices will be done using two virtual machines using VirtualBox running on Windows Operating System. One machine is defined as the server where the main configuration will be done, whereas the second machine represents the client to establish the communication between server-client. Besides the preparation of the environment (Installing the two virtual machines), in this lab the students will have to install a DHCP server as a support to get acquainted with the networking protocols.

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h
Chapter 2 (Part 1): Network application protocols

Description:
- Introduction
- Web service: The HTTP protocol
- DNS and DHCP
- Email service: The SMTP, POP3 and IMAP4 protocols

Related activities:
Lab 2: P02: Configuration of an HTTP server
- Installation of a HTTP server to communicate a client with the server. In this lab, the basics about how the communication using this protocol is reviewed as well as the main messages when visiting a website. Client and server machines are the virtual machines configured from the previous lab.

Lab 3: P03: Configuration of a DNS server
- In this lab a DNS server is installed to identify several machines using different domain names. This lab continues with the virtual machines configured from the previous lab, where a DHCP and HTTP server have been already installed and configured.

Full-or-part-time: 25h
Theory classes: 6h
Laboratory classes: 4h
Self study: 15h

Chapter 3 (Part 1): Definition, requirements and provisioning of QoS

Description:
- Introduction
- Definition
- Requirements
- Quality of Service
- Basic notions of Quality of Experience
- Basic notions of Quality of Resilience

Full-or-part-time: 5h
Theory classes: 2h
Self study: 3h

Chapter 4 (Part 1):

Description:
- Streaming applications
- Streaming session, data and control protocol
- The RTPs family
- Voice over IP

Related activities:
Lab 4: P04: Configuration of a streaming server
- Installation and configuration of streaming server using the virtual machines obtained with the previous lab. Students must generate the video stream as well as to receive and display it accordingly.

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h
**Chapter 5 (Part 2): Sistemes 3D (I)**

**Description:**
1. Captura d'escenes en 3D.
2. Càmeres estereoscòpiques.
4. Rigs 3D.
5. Tècniques per a la visualització de cinema en 3D.
6. Història del cinema en 3D.
7. 3D i omnimax.
8. Explosió comercial del cinema 3D.
9. Conversió de pel·lícules convencionals a 3D.

**Related activities:**
Exercicis proposats a la Pràctica P01.

**Full-or-part-time:** 5h
Theory classes: 1h
Laboratory classes: 1h
Self study : 3h

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**Chapter 6 (Part 2): Sistemes 3D (II)**

**Description:**
1. Televisió i 3D.
2. Compatibilitat alta definició i 3D.
3. Tecnologies de representació d'imatges en 3D.
4. Interpretació de la informació: anàlisi i processat d'àudio i vídeo.
5. Càlcul de la profunditat a partir de diferents càmeres.
6. Codificació de vídeo en 3D.
7. Concepte de telepresència i sistemes immersius.
8. Extensió a múltiples sensors: visuals, auditius, olfactius i tàctils.

**Related activities:**
Exercicis proposats a la Pràctica P02.

**Full-or-part-time:** 5h
Theory classes: 1h
Laboratory classes: 1h
Self study : 3h

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**Chapter 7 (Part 2): Alta definició (I)**

**Description:**
1. Orígens: De la definició estàndard a la SHD.
2. L'Alta Definició (HD).
3. Super Alta Definició (SHD).

**Related activities:**
Exercicis proposats a la Pràctica P03.

**Full-or-part-time:** 5h
Theory classes: 1h
Laboratory classes: 1h
Self study : 3h
Chapter 8 (Part 2): Alta definició (II)

Description:
1. Displays: Tecnologies i evolució.
2. Conseqüències de la implantació de l’alta definició.
3. Previsions de futur per a les tecnologies de visionat.

Related activities:
(ENG) Exercicis proposats a la Pràctica P04.

Full-or-part-time: 5h
Theory classes: 1h
Laboratory classes: 1h
Self study: 3h

Chapter 9 (Part 2): Sistemes Biomètrics

Description:
1. Introducció als sistemes biomètrics
2. Emprements dectilars.
3. Reconeixement d’iris.
4. Reconeixement de veu.
5. Reconeixement de cares.

Related activities:
(ENG) Exercicis proposats a la Pràctica P05.

Full-or-part-time: 5h
Theory classes: 1h
Laboratory classes: 1h
Self study: 3h

Chapter 10 (Part 2): Aplicacions sensibles a context

Description:
1. Concepte de context-awareness.
2. Diferència entre sensibilitat al context i al contingut.
3. Sensors de context.
4. Interfícies home-màquina específiques per al context.
5. Exemples d’interfícies.
6. El futur dels dispositius mòbils i la seva relació amb el web.
7. Xarxes socials des de dispositius mòbils.

Related activities:
(ENG) Exercicis proposats a la Pràctica P06.

Full-or-part-time: 5h
Theory classes: 1h
Laboratory classes: 1h
Self study: 3h
### Chapter 11 (Part 2): Adaptació de continguts

**Description:**
(ENG) 1. Tipologia d'identificadors: Terminal, usuar, xarxa, contingut i posició.  
2. Tècniques per a l'adaptació de continguts.  
3. Exemples d'aplicacions d'adaptació de continguts.  
4. Motors d'adaptació de continguts.  
5. Sistemes experts i ontologies per a l'adaptació de continguts.  
6. Adaptació de continguts i gestió de drets en continguts digitals.  

**Related activities:**  
(ENG) Exercicis proposats a la Pràctica P07.

**Full-or-part-time:** 5h  
Theory classes: 1h  
Laboratory classes: 1h  
Self study : 3h

### Chapter 12 (Part 2): MPEG 7: Introducció

**Description:**  
(ENG) 1. Introducció, context i objectius.  
3. Descriptors.  
4. Esquemes.  
5. DDL's.  
6. Tipus de descriptors.  
7. Descriptors de color I.  

**Related activities:**  
(ENG) Exercicis proposats a la Pràctica P08.

**Full-or-part-time:** 5h  
Theory classes: 1h  
Laboratory classes: 1h  
Self study : 3h

### Chapter 13 (Part 2): MPEG 7 Video (I)

**Description:**  
(ENG) 1. Descriptors de color II.  
2. Descriptors de moviment I  

**Full-or-part-time:** 2h 30m  
Theory classes: 1h  
Self study : 1h 30m

### Chapter 14 (Part 2): MPEG 7 Video (II)

**Description:**  
(ENG) 1. Descriptors de moviment II.  
2. Descriptors facials.  

**Full-or-part-time:** 2h 30m  
Theory classes: 1h  
Self study : 1h 30m
### Chapter 15 (Part 2): MPEG 7 Video (III)

**Description:**
(ENG) 1. Descriptors de forma.
2. Descriptors de textura.

**Full-or-part-time:** 2h 30m
Theory classes: 1h
Self study: 1h 30m

### Chapter 16 (Part 2): MPEG 7 Audio

**Description:**
(ENG) 1. Introducció als descriptor d'àudio.
2. Descriptors d'àudio de baix nivell.
3. Descriptors d'àudio d'alt nivell.

**Full-or-part-time:** 2h 30m
Theory classes: 1h
Self study: 1h 30m

### Chapter 17 (Part 2): MPEG 21

**Description:**
(ENG) 1. Introducció, context i objectius
3. Digital Items.
4. Protecció de drets de propietat intel·lectual.
5. Adaptació de Digital Items.

**Full-or-part-time:** 2h 30m
Theory classes: 1h
Self study: 1h 30m

### ACTIVITIES

**(ENG) PRÀCTICA P01: ANÀGLIF**

**Part 1- P01: Preparation of a VM and configuration of a DHCP server**

**Full-or-part-time:** 2h
Laboratory classes: 2h

**(ENG) PRÀCTICA P02: SO 3D I ENVOLUPANT**
Part 1- P02: Configuration of an HTTP server

Full-or-part-time: 2h
Laboratory classes: 2h

(ENG) PRÀCTICA P03: COMPARATIVA TECNOLÒGICA

Part 1- P03: Configuration of a DNS server

Full-or-part-time: 2h
Laboratory classes: 2h

(ENG) PRÀCTICA P04: DISPLAYS I APLICACIONS

Part 1- P04: Configuration of a streaming server

Full-or-part-time: 2h
Laboratory classes: 2h

(ENG) PRÀCTICA P05: BIOMETRIA

(ENG) PRÀCTICA P06: SENSIBILITAT AL CONTEXT

(ENG) PRÀCTICA P07: ADAPTACIÓ DE CONTINGUT

(ENG) PRÀCTICA P08: MPEG-7 INTRODUCCIÓ
GRADING SYSTEM

- Attendance and in class participation: 10%
- Both parts of the course have the same weight, 45%, in the final grade of the course, distributed as follows:

Part 1:
- Preparation of questions and answers on the topics of this part: 5%
- Execution of lab exercises: 15% (3.75% per exercise)
- Partial exam (of the whole Part 1) 25%

Part 2:
- 2 Practice Exercises with a weighting of 4% of the final mark of the subject each
- 6 Practice Exercises with a weighting of 2% of the final grade of the subject each.
- Final Exam of the second part of the course with a weighting of 25% of the final grade of the subject.

Reassessment: Students who have not passed the course by continuous assessment have the option to be submitted to the reassessment exam. To be eligible you need to have presented the process of continuous assessment. The reassessment exam will be only about the theoretical matter and will reevaluate the 60% of the grade corresponding to the three exams of the continuous assessment.

EXAMINATION RULES.

Lab sessions:
The practical exercises begin during class time in the time slot designated for them and are completed regardless of the Schedule of class following the instructions given in the corresponding Practice Sheet document and the indications which for this purpose are given in the corresponding part of the class.
The resolution of the practical exercises will be delivered using the Atenea campus in the delivery space enabled for each practice, following the indications described in the corresponding Practice Sheet document, following the indicated terms. To the end of the practice, the required files will be delivered. The correct management of the documentation provided is one aspect related to the competences to be acquired and is, therefore, subject to evaluation.
The evaluation of the practices does not only involve the resolution of the proposed exercises, but also the defense that is made of the results when the student is required to do so at the beginning of classes.
Any incident that does not allow the practice to be resolved within the indicated period must be communicated to the corresponding teacher by message through the Virtual Campus; After this communication, the relevance or not of the causes that motivate the non-presentation of the exercise and alternatives will be established to complete the evaluation if the causes are justified.
The causes for not presenting exercises that are communicated to the teaching staff from the CITM authorities will also be considered justified.

Exams:
The exams of the subject are carried out in the laboratory with computers by means of an electronic document that the student must to complete. The questions and problems proposed in the exams refer to both the theoretical content of the subject and to the exercises solved in the different practices. Apart from each question or problem, there is the contribution in points to the Total exam grade.
The reviews and / or claims regarding the exams will be carried out exclusively on the dates and times established in the Academic calendar.

BIBLIOGRAPHY

Basic:

Complementary: