804254 - XJO - Networks and Online Games

Coordinating unit: 804 - CITM - Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre
Academic year: 2019
Degree: BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan

Teaching staff
Coordinator: Lluch Ariet, Magí
Others: Díaz García, Jesús
Abadal Cavallé, Sergi

Opening hours
Timetable: Tuesday from 16:00 to 17:00

Prior skills
To be able to programme and develop computer applications
To know and be the main Internet tools and services at user level

Degree competences to which the subject contributes

Specific:
CEVJ 5. (ENG) Utilizar lenguajes de programación, patrones algorítmicos, estructuras de datos, herramientas visuales de programación, motores de juego y librerías para el desarrollo y prototipado de videojuegos, de cualquier género y para cualquier plataforma y dispositivo móvil.
CEVJ 13. (ENG) Implementar y gestionar proyectos de diseño y desarrollo de videojuego incluyendo la planificación, dirección, ejecución y su evaluación.

Generical:
CGFB5VJ. (ENG) Interpretar l'estructura, funcionament i interconnexió dels sistemes informàtics, així com els fonaments de la seva programació.

Transversal:
05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
07 AAT. 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.
04 COE N3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
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Teaching methodology

The teaching methodology is divided in four parts:
- Sessions for the content’s exposition at classroom
- Practical working sessions at classroom (training for the use of the tools, presentations and use case debates)
- Practical development of applications with special reference to the use case of a collaborative exchange system
- Autonomous work to study and carry out exercises and activities

Learning objectives of the subject

- To show understanding and application capacity in the on-line game development, about foundations of telematics networks, their capacities and limitations
- To be able to identify the problems related to online games caused by the network limitations and propose solutions
- To show knowledge and be able to use network game engines, for the development of online games
- To show knowledge and domain of game servers and to know how to use them for the development and implementation of online games

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>18h</th>
<th>12.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>30h</td>
<td>20.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>12h</td>
<td>8.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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### 1. Presentation, methodology and evaluation

**Learning time:** 4h  
Theory classes: 4h

**Description:**  
1.1 Presentation of the subject and evaluation criteria  
1.2 History and evolution of computer networks  
1.3 Standardization institutions and OSI reference model from ISO  
1.4 The scenario of the project, multy-agent systems and behaviour strategies

**Related activities:**  
Practice 1: Sockets and Data Bases

### 2. Design of Distributed Systems

**Learning time:** 11h  
Theory classes: 2h  
Guided activities: 2h  
Self study: 7h

**Description:**  
2.1 Sequence diagrams  
2.2 State diagrams  
2.3 Petri Networks

**Related activities:**  
Project SISIMEX

### 3. Distributed Systems and Grafs

**Learning time:** 46h  
Theory classes: 10h  
Guided activities: 10h  
Self study: 26h

**Description:**  
3.1 Introduction to Distributed Systems  
3.2 Definition, characteristics, properties and types of graphs  
3.3 Routing: BFS, Dijkstra and Floyd  
3.4 Map coloring

**Related activities:**  
Threats and Dijkstra  
Project SISIMEX
### 4. Networks and protocols

**Description:**
- 4.1 Local Area Networks (Topologies, MAC and Ethernet protocols)
- 4.2 Digital codifications (Shannon’s Theorem)
- 4.3 Error detection (Checksum)
- 4.4 Internet and IP Networks
- 4.5 TCP / UDP
- 4.6 Services ICMP, DHCP, NAT and DNS

**Related activities:**
- Networked games in Unity

**Learning time:** 44h
- Theory classes: 16h
- Guided activities: 16h
- Self study: 12h

### Planning of activities

<table>
<thead>
<tr>
<th>1. Sockets and Client-Server architecture</th>
<th>Hours: 7h 30m</th>
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<td>Self study: 7h 30m</td>
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<tr>
<th>2. Threads and Dijkstra</th>
<th>Hours: 2h 30m</th>
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<tr>
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<td>Self study: 2h 30m</td>
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<table>
<thead>
<tr>
<th>3. Networked games in Unity</th>
<th>Hours: 10h</th>
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<tr>
<td></td>
<td>Self study: 10h</td>
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<tr>
<th>4. Project: SI SI MEX</th>
<th>Hours: 25h</th>
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<tr>
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<td>Self study: 25h</td>
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Qualification system

Practice 1: 5%
Practice 2: 5%
Practice 3: 5%
Project: 25%
Partial exam: 20%
Final exam: 30%
Contribution and learning attitude of the student: 10%
In case the subject is not passed through the continuous evaluation there is the option to perform a re-evaluation exam of the theoretical part, corresponding to 50% of the subject's mark.

Regulations for carrying out activities

The evaluation activities are individual.
For the practices it is allowed to use all learning material and their submission must be done on the indicated deadline with no option for extension.
Exams will be done with no access to any learning material.

Bibliography

Basic:


Complementary: