# 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:** 2017  
**Degree:** 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

## Opening hours

**Timetable:** Thursday 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.

### Generic:

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

### Transversal:

- 05 TEO 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 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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<tr>
<td></td>
<td>Hours medium group:</td>
<td>30h</td>
<td>20.00%</td>
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<td></td>
<td>Hours small group:</td>
<td>0h</td>
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<td></td>
<td>Guided activities:</td>
<td>12h</td>
<td>8.00%</td>
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<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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<tr>
<td>Content</td>
<td>Learning time:</td>
<td>Practical classes:</td>
<td>Guided activities:</td>
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<tr>
<td><strong>1. Presentation, methodology and evaluation</strong></td>
<td>2h</td>
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<tr>
<td><strong>Description:</strong></td>
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<tr>
<td>1. Presentation, methodology and evaluation</td>
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<tr>
<td>1.1. Presentation of the subject and evaluation criteria</td>
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<td>1.2. History and evolution of computer networks</td>
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<td>1.3. Standardization institutions and OSI reference model from ISO</td>
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<td><strong>2. Networks and protocols</strong></td>
<td>28h</td>
<td>10h</td>
<td>8h</td>
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<td><strong>Description:</strong></td>
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<td>2.1. Local Area Networks (Topologies, MAC and Ethernet protocols)</td>
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<td>2.2. Digital codifications (Shanon?s Theorem)</td>
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<td>2.3. Error detection (Checksum)</td>
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<td>2.4. Internet and IP Networks</td>
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<tr>
<td><strong>Related activities:</strong></td>
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<tr>
<td>Practice 1: Sockets</td>
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<td><strong>3. Distributed Systems and Grafs</strong></td>
<td>22h</td>
<td>8h</td>
<td>4h</td>
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<td><strong>Description:</strong></td>
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<td>3.1. Systems for disc and memory sharing</td>
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<td>3.2. Transactions, timestamp</td>
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<td>3.3. Network representation in grafs</td>
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<td>3.4. Graf topology and properties</td>
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<td>3.5. Routing (Dijkstra algorithm)</td>
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<td>3.6. Intelligent Agents (Agents Architecture and MultiAgent Systems)</td>
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<td><strong>Related activities:</strong></td>
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<td>Practice 2: Data persistence</td>
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<td>Practice 3: Threats</td>
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### 4. Design of Distributed Systems - Use case: The exchange system

**Learning time:** 32h  
**Practical classes:** 10h  
**Guided activities:** 2h  
**Self study:** 20h

**Description:**
- 4.1. Design of Distributed Systems
- 4.2. Use case: The exchange system
- 4.3. The actors and sequence diagrams
- 4.4. Design of the System’s protocol
- 4.5. Design of Behaviour strategies of each node

**Related activities:**
Practice 4: Elements design of the use case

### 5. Practices

**Learning time:** 66h  
**Guided activities:** 16h  
**Self study:** 50h

**Description:**
- 5.1. Exchange system elements implementation
- 5.2. Exercises and practical activities with networked games engines and game servers
- 5.3. The Bonjour protocol
- 5.4. Multiplayer in real time

**Related activities:**
Practice 5: Collection of exercises for the elements implementation of the exchange system

### Qualification system

Practice 1: 5%  
Practice 2: 5%  
Practice 3: 5%  
Practice 4: 5%  
Practice 5: 20%  
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.
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**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:**