804037 - PEV-M - Virtual Environment Programming

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 MULTIMEDIA STUDIES (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits:	6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator:	Loepfe, Lasse

Degree competences to which the subject contributes

Specific:
1. (ENG) Identificar els diferents sistemes de Realitat Virtual i els principis fisiològics i psicològics en els que es basen

2. (ENG) Aplicar les tècniques d¿optimització de models i escenes per aplicacions de Realitat Virtual.

Transversal:
3. 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.
4. 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.
5. 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

The subject is divided in sessions of 2h, where three different activities take place:
1. Explanation of the main topics of the subject: the lecturer explains the new topics and presents the material to do the proposed activities (notes, exercises to solve, working plan, etc.).
2. Correction of exercises/activities: the student shares with the rest of the class the difficulties found during the resolution of the proposed activities and proposes solutions/alternatives related to the topics and technologies used. Some tests related to the work carried out during the course may be made.
3. Team work: the students develop the projects/activities proposed at class with the assistance of the lecturer.

Learning objectives of the subject

- Understand the main topics to design and develop virtual environments.
- Accquire the basic knowledge of the software used to develop virtual environments: Unity3D in our case.
- Apply the accquired knowledge in decisiton making, work planning and bibliography research to be able to develop virtual environments in a satisfactory way.
- Be able to communicate in a proper way the results of your work.
- Be able to plan and use the information required to present an academic project (the TFG, for instance) by means of a critical reflection on the resources used.

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Study load

Total learning time: 150h			
	Hours large group:	0h	0.00%
	Hours medium group:	60h	40.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

1. Introduction	Learning time: 10h
	Theory classes: 4h Self study : 6h

Description:
0. Definition and applications of virtual environments.
1. Introduction to Unity3D.
    1.1. Interface
      1.2. Game Objects
      1.3. Components
          1.3.1. Transform
          1.3.2. Renderer
      1.4. Parenting
      1.5. Pivots
      1.6. Prefabs

2. Scene creation	Learning time: 70h
	Theory classes: 28h Self study : 42h

Description:
1. Basic predefined objects.
    a. Camera
    b. Lights
2. Materials.
3. Components.
4. Physics
5. Terrain
6. Animation
7. Particle systems
8. User interface.

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3. Scene interaction: scripting	Learning time: 70h
	Theory classes: 28h Self study : 42h

Description:
1. Scripting introduction.
   a. Component oriented structure.
   b. Variables.
   c. Functions.
   d. Debugging.
2. Create and delete objects.
3. Translation, rotation and scaling.
4. Time control.
5. Modify components' behaviour.
6. Game Control
7. Puzzles

Planning of activities

Coding Exercise	Hours: 10h Self study: 10h
Description: Little project with clear indications to get in touch with Unity and coding	

Project	Hours: 30h Self study: 30h
Description: You'll have to develop a small game in Unity	

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Qualification system

Projects:
- 3 projects: 40% of the mark of the subject.

Exams:
- 1 midterm exam: 20% of the mark of the subject.
- 1 final exam: 30% of the mark of the subject.

Participation and learning attitude: 10% of the mark of the subject.
This part will be evaluated according to the participation of the student at class (solving exercises, proposing solutions/alternatives), the interest shown in learning the different topics and developing the projects, etc.

The students who do not pass the course will have the possibility to do a reevaluation exam (just the 50% corresponding to the exams is evaluated, and 5 will be the maximum mark of the subject).

Regulations for carrying out activities

Part of the activities will be developed at class with the assistance of the lecturer. Students should also work autonomously to finish the activities proposed during the course.

Projects will be submitted via Campus Virtual following the guidelines provided by the instructions document of each one (name of the files, etc.). Projects submitted after midnight of the specified date will be considered as NP. Any issues that do not allow the student to submitt a project in time should have a reasonable cause and must be communicated with enough anticipation to the lecturer. The evaluation of the projects does not consist just on submitting the code, but also on oral presentations when required.

Projects have to be executed at CITM, so be sure that you work with the same Unity3D version as the one provided at the center and that your projects can be executed there without errors.

Bibliography

Others resources:
> Unity3D: https://unity3d.com
> API Scripting Unity3D: https://docs.unity3d.com/ScriptReference/
> Unity3D tutorials: https://unity3d.com/es/learn/tutorials
> https://www.raywenderlich.com/unity
> https://catlikecoding.com/unity/tutorials/
> https://unitycodemonkey.com/