COURSE DATA

Data Subject

Code	44828
Name	Mobile devices and reality increased
Cycle	Master's degree
ECTS Credits	4.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps	3 - Client-Side Development and Graphics	Obligatory

Coordination

Name	Department
GIMENO SANCHO, JESUS	240 - Computer Science

SUMMARY

The subject is divided into two blocks: mobile devices and augmented reality. In the first block the aspects related to the development of applications for mobile devices, understanding of the development in this type of devices, differences with a conventional computer, comparison of the main platforms, development tools and interaction with services. The second block explains the interaction paradigm called augmented reality, addressing its fundamental aspects: creation of virtual contents, motion capture, mixing of real and virtual information and user interaction with virtual information.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Programming knowledge is required

OUTCOMES

2234 - M.D. in Web Technology, Cloud Computing and Mobile Apps

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

- Students should demonstrate self-directed learning skills for continued academic growth.

- Students should possess and understand foundational knowledge that enables original thinking and research in the field.

- Ability to apply acquired knowledge and solve problems in new or little-known environments within broader and multidisciplinary contexts, being able to integrate this knowledge.

- To foster, in academic and professional contexts, technological, social or cultural advancement within a society based on In knowledge and respect for: a) fundamental rights and equal opportunities between men and women; b) principles of equal opportunities and universal accessibility of persons with disabilities; and, c) the values of a culture of peace and democratic values.

- Ability to understand and apply the operation and organization of component models, intermediary software and services.

- Ability to analyze the storage needs that arise in an environment and to carry out the implantation of a solution in the fields of Web technologies, cloud computing and mobile applications.

- Ability to design and develop general-purpose mobile applications with graphics, augmented reality, with advanced user interaction and / or communicating with remote services.

- Ability to design, develop and maintain Web applications using technologies and frameworks both in the client and in the server sides.

LEARNING OUTCOMES

- Specify and complete computer tasks that are complex, incompletely defined or unfamiliar

- Describe and explain techniques and methods applicable to their particular area of study and identify their limitations

- Organize your own work independently, demonstrating initiative and exercising personal responsibility

- Perform bibliographic searches and reviews using databases and other sources of information

- Learning and improving personal performance as the basis for lifelong learning and professional development

- Communicate effectively both verbally and through other media to a variety of audiences and preferably in a second language

- Develop accessible applications to promote equal opportunities

- Know and use the components offered by the framework to develop mobile applications

- Develop applications that locally store information on mobile devices

- Understand and use multi-threaded programming patterns on mobile devices

- Develop applications that access remote services from mobile devices

- Know and use augmented reality frameworks to develop mobile applications

- Develop interactive entertainment-oriented mobile apps

- Develop multi-user graphical applications

DESCRIPTION OF CONTENTS

1. Platform Architecture and components for the development of applications

2. Local Storage

3. Patterns for multi-thread programming and service access

4. Capture of the point of view, generation of virtual information, fusion of the real and the virtual, user interaction

5. Image-based motion capture systems, accelerometers and GPS

6. 3D graphics on mobile devices and mixing of real images with virtual information

7. Multimodal interaction through a mobile device: touch screen, voice recognition and motion capture

WORKLOAD

ACTIVITY	Hours	% To be attended
Theoretical and practical classes	40,00	100
Development of group work	6,00	0
Study and independent work	35,00	0
Preparation of practical classes and problem	16,00	0
Resolution of online questionnaires	3,00	0
TOTAL	100,00	

TEACHING METHODOLOGY

The teaching methodology is based on master classes, project-based learning and problem-based learning. The professors will provide the necessary materials to the students to prepare each face-to-face class. In these classes the contents will be explained in the form of a master class, but also debates and related problems will be proposed. The problems will be based on real cases that the students will be able to solve applying the theorical contents.

In the practical part, the students will develop software projects using mainstream tools of the professional sector. These projects will be carried out throughout the course, with the final objective of developing prototypes of mobile and augmented reality applications, in which the theoretical contents will be applied as they are worked in class.

EVALUATION

The evaluation systems used in this subject are:

SE1: Online evaluation and / or degree of participation
The participation of the students and the completion of the questionnaires or activities proposed during the classes will be taken into account.

SE2: Evaluation of problems, works, reports and / or memories
It will consist of the development and presentation of a monographic work about one of the topics proposed at the beginning of the course.

SE4: Face-to-face evaluation
It will consist of an exam. This type of evaluation will be used only on second call as an alternative to other evaluation methods.

SE6: Evaluation of laboratory practices
It will consist of the realization of several projects following the proposed statements. In these projects the concepts worked in theory will be practiced to solve problems related to real cases.

On first call, it will be necessary to obtain a minimum grade of 4 out of 10 in parts SE2 and SE6. The formula to calculate the final grade on first call is as follows:
SE1 10% + SE2 30% + SE6 60%

Second, two options are offered to students:
- Option 1: Keep the same formula. Students will be able to improve the grade for parts SE2 and SE6 by carrying out equivalent activities proposed by the teaching staff. Part SE1 will not be recoverable because it values participation during classes.
- Option 2: an exam that will account for 100% of the final grade.

REFERENCES

Basic

- Android programming concepts. Autores Trish Cornez y Richard Cornez. Editorial Burlington, MA. 2017. ISBN 9781284070705.

- Augmented reality: principles and practice. Autores Dieter Schmalstieg y Tobias Höllerer. Editorial Addison-Wesley. 2016. ISBN 9780321883575.

- A Survey of Augmented Reality. Ronald T. Azuma. In Presence: Teleoperators and Virtual Environments. 1997.

- Spatial Augmented Reality. Autores Oliber Bimber y Ramesh Raskar. Editorial AK Peters, Ltd. 2004. ISBN 1-56881-230-2.

- React Native for Mobile Development. Autores Akshat Paul y Abhishek Nalwaya. Editorial Springer.