COURSE DATA

Data Subject	
Code	34855
Name	Multimedia information
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	School of Engineering	3	First term

Subject-matter

Degree	Subject-matter	Character
1407 - Degree in Multimedia Engineering	9 - Gestión de la Información Multimedia	Obligatory

Coordination

Name	Department
COMA TATAY, INMACULADA	240 - Computer Science
VES CUENCA, ESTHER DE	240 - Computer Science

SUMMARY

The subject "Multimedia Information" is a subject that is taught in the first quarter of third year of Degree in Multimedia.

This course presents an introduction to different types of multimedia information such as images, audio, video and text as well as existing compression algorithms for different types of information. It also presents how to manage (insert, update, delete and recovery) this type of information. We describe the generic structure of a multimedia information management and the modules within it. As an example we analyze the scheme GEMINI (Generic Multimedia Indexing Object Approach).

This subject also covers aspects related to the physical structures for the storage of information. We study the physical data structures used by BD for efficient access to information. In particular we analyze the trees B and B + trees.

Finally, the course introduces the student to some advanced concepts of databases. In particular we

analyze the recovery techniques database against failures and classified depending on whether the update made deferred or immediate. As an illustration we study the ARIES recovery algorithm. It also provides a first approach to data stores and systems to support decision making.

The main objective of this course is to present and describe the different types of multimedia data such as images, video, audio and text as well as how to manage and retrieve this information.

• Knowing the basic characteristics of multimedia data types and the different formats of representation as to the storage and processing needs.
• Understanding the existing compression algorithms for each of these data types.
• Knowing the components of a multimedia information management regarding the processing and efficient recovery of such information.
• Knowing how to describe the multimedia data as search algorithms work in BDS media.
• Knowing the physical data structures used to store and BDs efficient access to information.
• Provide students with a basic understanding of concepts such as BDs advanced recovery techniques database against failures, data stores and systems to support decision making.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

It is recommended to have attended course on Databases. This course assumes that students have acquired the skills taught in that course.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1405 - Degree in Multimedia Engineering

- G1 - Be able to relate and structure information from different sources and to integrate ideas and knowledge. (RD1393/2007)
- G3 - Take into account the economic and social context in engineering solutions, be aware of diversity and multiculturalism and ensure sustainability and respect for human rights and equality between men and women.
- G5 - Be able to lead working groups properly, respect and appreciate the work of others, take into account the needs of the group and be available and accessible.
- I2 - Know, design and make an efficient use of the data types and data structures that are most suited to solving a problem.
- I7 - Know and apply the features, functionalities and structure of databases, be able to use them properly and to design, analyse and implement applications based on them.

- I8 - Know and apply the tools needed for the storage of, processing of and access to information systems, including web-based systems.
- MM3 - Be able to implement methodologies, technologies, processes and tools for the professional development of multimedia products in a real context of use by applying the appropriate solutions for each environment.
- MM5 - Know how to apply the theoretical and practical resources to deal with a multimedia application as a whole.
- MM8 - Integrate knowledge of different multimedia technologies to create products that offer global solutions that are appropriate to each context.
- MM10 - Be able to analyse and integrate software components to develop multimedia applications.
- MM14 - Be able to create multimedia contents for production environments in broadcasting and digital edition.
- MM15 - Be able to respond professionally to the requirements at each step of a multimedia production process: show skills for preparing and understanding scripts and communication, graphic design for communication, management of streaming technology, web design and production and post-production processes.
- MM26 - Be able to conceive, develop and maintain multimedia systems, services and applications using the methods of software engineering as a tool for quality assurance, according to the knowledge acquired as described in the specific competences.
- MM28 - Be able to solve problems with initiative, decision-making and creativity and to communicate and transmit the knowledge, abilities and skills of a multimedia engineer.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

This course allows for the following learning outcomes:
1 Have the basics to define, design and implement information systems using management systems databases.
2 Having the tools to define, enter, edit and exploit multimedia information management system database.
3 Apply the principles and techniques of relational model for application development of multimedia databases
4 Analyze and properly characterize the performance issues associated with data-intensive applications and have the expertise to take adjustment and optimization solutions.
5 Understand the model representation of multimedia objects based on the content and the framework of applicable recovery.
6 Know the best data representation formats depending on project needs both in cost of storage and processing
7 Understanding the mechanisms of transmission of mass content of multimedia information over the network.
8 Designing suitable policies for crash recovery of databases

DESCRIPTION OF CONTENTS

1. Introduction

Definition of multimedia.
Digital representation of information.
Digitalization.
Media objects.

2. Graphics

Bitmaps
Color description
Image compresión.
Vector graphics.
Storage formats.

3. Video

Sources: TV and analog video.
Video digitizing.
Digital video standards.
Video compression techniques.
Compression formats.
Storage formats.

4. Audio

Nature of sound.
Digitalization of sound.
Audio compression techniques.
Compression standards.
Storage formats.
MIDI.

5.

Descriptors of image, sound, video and text
Similarity measures.
Search algorithms in multimedia BDs. Relevance feedback.
Evaluation of results.
Multiagent architectures oriented information retrieval on the Web.
Scheme GEMINI (Generic Multimedia Indexing Object Approach).

6. Physical support structures for data storage

Introduction: file and disk.
Basics organizing files.
Messy files, sorted and dispersed.
Indexes. Structures for organizing indexes. Trees B and B + Trees. Dispersion indices.
Multidimensional indices.

7. Advanced conceptss

Introduction to techniques for crash recovery
Deferred update and immediate update.
ARIES recovery algorithm.
Backups.
Data Warehouse. Data stores and support systems for decision-making.
Oriented database objects.
Parallel databases and distributed.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
Development of group work	3,00	0
Development of individual work	6,00	0
Study and independent work	12,00	0
Readings supplementary material	1,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	14,00	0
Preparation of practical classes and problem	35,00	0
Resolution of case studies	9,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

LECTURES:

The lectures will be based on active lectures where every 20/25 minutes will be introduced in any activity that requires the involvement of students, so that 1) they can do an activity based on the content they have just learnt, 2) recover the level of attention to the next block.

LECTURES PREPARATION:

Students have to prepare the lecture content, following the plan of the course. To do this they will use the literature suggested by the lecturer as well as the materials provided him or/and any other directions provided by the lecturer.

PREPARATION OF PRACTICAL WORK:

To better assimilate the contents of the lectures, practical sessions are conducted in the laboratories. Attendance at practical sessions is mandatory and will be verified by the lecturer in charge of the session. Those students that are working and can not attend the practical sessions should contact the lecturer before the beginning of the first session. The results of these activities must be submitted to the lecturer in charge of the group during the course and in the terms established by the lecturer. Students are expected to do/prepare some of these activities at home.

TEAM WORK:

A set of problems will be propossed that should be solved in teams of 3 to 6 persons. Each member of the group will be graded both the joint mark of the group as the individual mark of each member.

The e-learnig platform (Aula Virtual) will be used as communication tool between the lecturer and the student. The student will access to all the material used in the lectures, through Aula Virtual, as well as all the problems and exercise that needs to solve.

The teaching methodology for this subject will follow the model approved by the Academic Committee of the GII / GIM degrees (https://go.uv.es/catinfmult/ModeloDocenciaGIIGIM). If the facilities are closed because of COVID-19 pandemics, the scheduled lectures will be replaced by synchronous online sessions within the assigned time slots of the course, using the tools provided by the university.

If the facilities need to be closed due to the pandemics causing any of the evaluation exercises to be held at ETSE-UV, these exercises will be substituted by equivalent exercieses held online using the tools provided by the university. The weights for each activity will remain the same as specified in the teaching guide.

EVALUATION

For the evaluation of the course the following aspects will be considered.

(C) Continuous assessment, based on participation and the degree of involvement on the teaching-learning process. The attendance on regular basis to on-campus lectures/activities will be taken into account. A set of activities consisting of individual and group work to do at home or in class, oral presentations, resolution of issues and problems in class, and some partial individual tests may be conducted during the course. These exercises may be proposed without previous notice.

(I)There will be a final individual test consisting of one or more written exams or test of knowledge. These tests will consist of both theoretical questions and practical problems. It will be necessary to approve each test to compensate.

(P) Assessment of practical activities based on the achievement of objectives in the laboratory sessions and problems and a final work. This section need to be approved to compensate.There will be a total of 8 practical sessions and each one must be delivered at the end of the session. Moreover, students must explain their work and answer the question of the teacher. Copied jobs will be failed. This section need to be approved to compensate.

The final mark is calculated as follows:

Final Mark = 0.2 * C + 0.5 + 0.3 * E * P

In the second call will be kept note of the continuous assessment (C) and parts (E and P) approved. For unapproved parts (E and P) will be an exam, calculating the final mark as you would at first call.

In any case, the evaluation of this subject will be done in compliance withthe University Regulations in this regard, approved by the GoverningCouncil on 30th May 2017 (ACGUV 108/2017)

REFERENCES

Basic

- Digital Multimedia. Chapman & Chapman.
- Multimedia Retrieval. H. Blanken, A. P. de Vries, H. E. Blok. Springer
- Data Management for multimedia Retrieval. K. S. Candan, M.L. Sapiro. Cambridge University Press.
- Visual Information Retrieval, Alberto del Bimbo, Morgan Khaufman, 1999
- An Introduction to Information Retrieval, Christopher D. Manning Prabhakar Raghavan Hinrich Schütze, Online edition (c) 2009 Cambridge UP

Additional

- Multimedia Fundamentals, Volume 1: Media Coding and Content Processing, Second Edition . Ralf Steinmetz; Klara Nahrstedt