COURSE DATA

DATA SUBJECT

Code: 34855
Name: Multimedia information
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	Escola Tècnica Superior d'Enginyeria	3	First quarter

SUBJECT-MATTER

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

COORDINATION

COMA TATAY INMACULADA

VES CUENCA ESTHER DE

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 / LEARNING OUTCOMES

-

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.

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.

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.

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. Indexing and retrieval of multimedia information

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

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	9,00
Independent study and work	13,00
Preparation of lessons	49,00
Preparation for assessment activities	10,00
Resolution of case studies	9,00
Total hours	**90,00**

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.

p>

EVALUATION

The evaluation of the subject will be carried out by:

(C) Continuous evaluation, based on participation and degree of involvement in the teaching-learning process, taking into account regular attendance at the planned face-to-face activities and the completion of the work. As activities within the continuous assessment, students will individually make a set of practical exercise or theoretical development bulletins that will be delivered in the virtual classroom within the deadline established for this purpose. Group activities will also be carried out in the classroom, of which a report will have to be submitted in the virtual classroom. In addition, three multiple-choice or brief controls will be carried out on a part of the subject.

Activities delivered after the deadline will not be taken into account, nor can activities not carried out be recovered. Copying in any of the activities will be strictly penalized, canceling all the student's continuous evaluation grades.

(E) Individual objective test, consisting of one or more exams, or knowledge tests, which will consist of both theoretical-practical questions and problems. It will be necessary to pass each of these tests to compensate.

(P) Evaluation of the internship based on attendance and completion of the work in the practical sessions. A total of 8 practical sessions will be held in each of which the student's attendance and the work that must be delivered at the end of the laboratory session in the virtual classroom will be assessed. Likewise, at the end of the laboratory session, the student must explain to the teacher the work done and answer their questions that will serve, together with the report delivered, to evaluate the practice. Internships submitted after the deadline will not be taken into account, nor can those not completed be recovered. Copying in any of the practices will be strictly penalized and the cheating activity will be suspended. It will be necessary to approve this section to compensate.

The final grade will be calculated as follows:

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

In the second call, the grade of the continuous assessment (C) and of the approved parts (E and P) will be preserved. An exam will be taken for the parts not passed (E and P), and the final grade will be calculated in the same way as in the first call.

In any case, the evaluation of the subject will be made in accordance with the Evaluation and Grading Regulations of the Universitat de València for bachelor's and master's degrees approved by the Governing Council on May 30, 2017 (ACGUV 108/2017).

The copying or manifest plagiarism of any activity that is part of the evaluation will make it impossible to pass the subject, then submitting to the appropriate disciplinary procedures indicated in the PROTOCOL OF ACTION AGAINST FRAUDULENT PRACTICES AT THE UNIVERSITAT DE VALÈNCIA (ACGUV 123/2020).

REFERENCES

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