



Course guide

804478 - MRE - Research Methods and Statistics

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Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN DIGITAL DESIGN AND MULTIMEDIA TECHNOLOGIES (Syllabus 2023).
(Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Martínez Navarro, Beatriz

Others: Villegas Portero, Eva
Fernández Ruiz, Marta
Hurtado Torres, Daniel
Molins Pitarch, Carla
Sora Domenjó, Carles
Candil Gil-Ortega, Daniel

TEACHING METHODOLOGY

The subject will be structured through three types of classes:

- Theoretical-practical sessions in which the theoretical content will be taught through activities and exercises carried out in the classroom. The structure of these sessions will generally consist of posing challenges or activities that students will have to solve individually or in groups, with the help of the teacher. Based on the results obtained and the difficulties encountered, the content related to the learning outcomes of the subject will be worked on.
- Talks given by other teachers and/or professionals from the creative industries. At the end of each session, students will fill out a questionnaire and, once all the talks have been carried out, an analysis and conclusion drawing exercise will be proposed.
- Sessions dedicated to monitoring individual work with which the entire subject will be articulated.

LEARNING OBJECTIVES OF THE SUBJECT

Knowledge

Recognise the importance of scientific and applied research in technological innovation, the design of digital products and the field of multimedia and communication.

Understand the processes involved in scientific and applied research: its strategies and the main types of designs.

Identify quantitative and qualitative research techniques applied to the field of digital and multimedia design.

Recognise basic concepts of descriptive statistics and their application in scientific and applied research.

Recognise basic concepts of inferential statistics and their application in scientific and applied research.

Skills

Plan a research project in the field of digital and multimedia design, including the development of a state of the art, objectives, hypotheses and variables involved.

Distinguish the most appropriate method for visualising data using graphics in the context of scientific and applied research.



STUDY LOAD

Type	Hours	Percentage
Guided activities	12,0	8.00
Self study	90,0	60.00
Hours medium group	18,0	12.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

Introduction to research

Description:

Opinion, description, argument and scientific proof
Scientific knowledge and the challenge of objectivity
What is research: search vs research
The scientific paper
What is innovation
The role of the university
Technological centers
Research in private companies
Academic path in research (Master and doctorate)

Specific objectives:

Understand what research is, what its role is and how important it is at a social and economic level.

Related activities:

Exercise 1: the scientific paper

Full-or-part-time: 12h

Theory classes: 6h
Practical classes: 2h
Self study : 4h



Research areas in the multimedia field

Description:

Multimedia technologies
Emergent technologies
Design of interactive and immersive experiences
Perception and cognitive processes
User experience
Applied research
Arts

Specific objectives:

Understand and analyze the different objectives, applications and methodologies of research carried out in the multimedia field.

Related activities:

Carrying out questionnaires related to the talks that different researchers will give about their research areas.
Exercise 2: analysis of the talks given in this content block.
Research work: definition of a problem and proposal of a research idea.

Full-or-part-time: 21h

Theory classes: 7h
Practical classes: 7h
Self study : 7h

Research methods

Description:

The initial question
The exploration
The definition of the problem
The selection of the topic and state of the matter
The theoretical construction
Construction of the analysis model
The methodology
Results and conclusions

Specific objectives:

Know the different research methodologies related to the multimedia field and the processes involved.
Know how to identify the methodology of a given research and analyze its level of rigor.
Apply an appropriate research methodology to a research idea.

Related activities:

Class activity: a short research in two hours.
Group exercise: a research on the CITM community
Final work: process of carrying out your research idea.

Full-or-part-time: 84h

Theory classes: 12h
Guided activities: 12h
Self study : 60h



Statistics for research

Description:

Qualitative and quantitative data
Discrete and continuous variables
Sample vs. Population
Relative frequency and types of graphs to display it
Frequency distribution – line diagram and histogram
Frequency distribution for continuous data
Measures of center
Measures of variability – box plots
Stability of observation over time

Specific objectives:

Know how to interpret data and graphics from articles.
Know how to approach the collection and management of data in your own project.

Related activities:

Exercise 3: small group research.
Final work: individual research project

Full-or-part-time: 33h

Theory classes: 7h
Guided activities: 7h
Self study : 19h

ACTIVITIES

Non evaluative activities un class

Description:

Activities will be carried out in class, in groups and individually, which will be analyzed in the classroom and will be used to work on the different contents of the subject.

These activities will cover the main aspects related to consulting and conducting research. The role of AI tools in each phase of the process, their usefulness, level of reliability and relevance of their use will also be analyzed.

Full-or-part-time: 8h

Guided activities: 8h

Exercise 1: paper's exploration

Description:

A search for scientific articles will be carried out and the summary and content structure will be analyzed. From there, a superficial assessment of the state of the art in the chosen topic will be made and the reading order of the complete articles will be determined.

Full-or-part-time: 8h

Guided activities: 2h
Self study: 6h



Exercise 2: research methods in the multimedia field

Full-or-part-time: 10h

Guided activities: 5h

Self study: 5h

Exercise 3: little research in group

Description:

A research idea will be proposed to be carried out using data collection from a sample of the population of the CITM community. The idea, its feasibility, the methodology for data collection and analysis, statistical measures and the writing of results and conclusions will need to be defined and carried out. A short scientific article will be written.

Full-or-part-time: 12h

Guided activities: 2h

Self study: 10h

Individual research work

Description:

Each student will carry out a small research project that may be related to their TFG, their TFG proposal, or any other idea that is interesting to them. It will be a small research project that can be developed during the course of the subject and in which special relevance will be given to the ideation process, feasibility analysis, writing of the state of the art and approach to the methodology.

This work will be carried out in a directed manner as the contents of the subject are taught and will be evaluated through partial submissions that will be monitored.

Full-or-part-time: 20h

Guided activities: 8h

Self study: 12h

GRADING SYSTEM

Two individual exercises, developed from activities carried out in the classroom -- 20% (10%+10%)

One group exercise -- 10%

Research work, broken down into:

-- Formulation of the problem and state of the art -- 10%

-- Writing of the state of the art and/or theoretical context of the research to be carried out -- 20%

-- Approach to the research methodology -- 10%

-- Final document -- 20%

Participation and learning attitude -- 10%-- will be evaluated through participation and submissions related to the activities carried out in class.

Students who do not pass the subject through continuous assessment may take the reassessment exam, provided that they do not have a NP grade. In this exam, the grades corresponding to the two individual exercises and the approach to the research methodology of the final work will be reassessed (in total, 40% of the subject).

Irregular actions that may lead to a significant variation in the grade of one or more students constitute fraudulent performance of an assessment act. This action entails the descriptive grade of fail and the numerical grade of 0 of the overall ordinary assessment act of the subject, without the right to re-assessment. If teachers have indications of the use of AI tools not permitted in assessment tests, they may summon the students involved to an oral test or a meeting to verify their authorship.

EXAMINATION RULES.

Los ejercicios de prácticas se explican e inician durante el horario de clase y se completan al margen del horario previsto de clase siguiendo las instrucciones que se dan en el documento Hoja de Práctica correspondiente y las indicaciones que a tal efecto se han dado en la parte de la clase correspondiente. La entrega de los ejercicios de prácticas se realizará utilizando el espacio de entrega del aula de la asignatura en el Campus Virtual, siguiendo las indicaciones descritas en el documento Hoja de práctica correspondiente y siguiendo los plazos indicados. No se aceptarán prácticas entregadas fuera de plazo. La correcta gestión de la documentación aportada es un aspecto relacionado con las competencias a adquirir y es, por tanto, objeto de evaluación. La evaluación de las prácticas no comporta sólo la resolución de los ejercicios propuestos, sino también la defensa que se haga de los resultados cuando el/la alumno/a sea requerido por ello al inicio de las clases. Cualquier incidencia que no permita resolver la práctica en el plazo indicado será comunicada al profesor correspondiente mediante mensaje por el Campus Virtual; con posterioridad a esta comunicación, se resolverá la o no pertinencia de cualquier causa que motiven la no presentación del ejercicio y se establecerán las alternativas para completar la evaluación si las causas son justificadas. También se considerarán justificadas las causas de no presentación de ejercicios que sean comunicadas al profesorado por el Jefe de Estudios.

BIBLIOGRAPHY

Basic:

- Busquet i Duran, Jordi; Sort i Jané, Josep; Medina Cambrón, Alfons. *Mètodes d'investigació en comunicació*. Barcelona : UOC, 2004. ISBN 849788079X.
- Box, George E. P; Hunter, William Gordon; Hunter, J. Stuart. *Estadística para investigadores : diseño, innovación y descubrimiento*. 2a ed. Barcelona [etc.] : Reverté, 2008. ISBN 9788429150445.
- Tufte, Edward R. *The Visual display of quantitative information*. 14th printing. Cheshire, Connecticut : Graphics Press, cop. 1983. ISBN 096139210X.
- Johnson, Richard A; Bhattacharyya, Gouri K. *Statistics : principles and methods*. 6th ed., International student ed. Hoboken : John Wiley & Sons, cop. 2010. ISBN 9780470505779.
- Quivy, Raymond; Estruch, Joan; Campenhoudt, Luc Van. *Manual de recerca en ciències socials*. Barcelona : Herder, 1997. ISBN 9788425419416.
- Hurtado de Barrera, Jacqueline. *Cómo formular objetivos de investigación*. Venezuela: Ediciones Quirón, 2005.
- Juhana, A., Anggelika, L., Abdul Azis, F.. "Exploring Research Approaches and Methodologies in Multimedia: Digital Media, Game Development, Visual Communication Design, Broadcasting, and Animation". *Jurnal Pendidikan Multimedia*.

RESOURCES

Hyperlink:

- Pàgina web amb articles interessants sobre el procés de recerca. <https://www.lluiscodina.com/>- Recursos per recerca de la biblioteca de la UPC. <https://biblioteca.upc.edu/investigadors>