

# Course guide 804451 - FS - Physics

Last modified: 08/07/2024

Unit in charge: Teaching unit:	Image Processing and Multimedia Technology Centre 804 - CITM - Image Processing and Multimedia Technology Centre.		
Degree:	BACHELOR'S DEGREE IN DIGITAL DESIGN AND MULTIMEDIA TECHNOLOGIES (Syllabus 2023). (Compulsory subject).		
Academic year: 2024	ECTS Credits: 6.0	Languages: Catalan	

# **LECTURER**

Coordinating lecturer: Sureda Anfres, Miquel

Others:

# **TEACHING METHODOLOGY**

The two-hour sessions are generally divided into three bands of activity:

- 1. Resolution of doubts about exercises proposed in previous sessions.
- 2. Explanatory session for the acquisition of new knowledge.
- 3. Practical session, solving exercises.

These activity bands are modulated depending on the complexity of the exercises and the corresponding contents.

# LEARNING OBJECTIVES OF THE SUBJECT

Knowledge:

- Identify scientific fundamentals through the study of physical phenomena that are mainly applied to the multimedia field.

- Use the mechanisms that govern optics, lighting and natural colours and the parameters that characterise them, to relate the scientific foundations that govern the parameters of audiovisual systems.

Skills:

- Accurately construct and model geometric objects and solve problems related to geometric objects, in order to acquire the scientific foundations that can later be applied to animation.

- Solve problems related to the functioning of acoustics in various physical environments.

## **STUDY LOAD**

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

### Total learning time: 150 h



# CONTENTS

# **1. INTRODUCTION TO PHYSICS**

#### **Description:**

- Introduction and revision of fundamental concepts of physics and mathematics
- General applications of physics in multimedia design
- Magnitude, units and dimensions, significant figures, scientific notation and orders of magnitude
- Coordinate systems and relative position

#### **Related activities:**

- Theoretical classes with resolution of practical exercises in the classroom
- Practical activities in small groups

### Full-or-part-time: 28h

Theory classes: 6h Practical classes: 4h Guided activities: 3h Self study : 15h

# 2. OPTICS

# **Description:**

- Properties of light
- Reflection and refraction
- Glasses
- Image formation by a lens
- Defects of lenses

# **Related activities:**

- Theoretical classes with resolution of practical exercises in the classroom
- Practical activities in small groups

#### Full-or-part-time: 42h

Theory classes: 9h Practical classes: 5h Guided activities: 3h Self study : 25h

# **3. COLOR THEORY**

### **Description:**

- Vision of light: the eye
- Mix of colored lights
- Mix of colored pigments
- Chromaticity diagrams

#### **Related activities:**

- Theoretical classes with resolution of practical exercises in the classroom
- Practical activities in small groups

# Full-or-part-time: 27h

Theory classes: 6h Practical classes: 4h Guided activities: 2h Self study : 15h



# 4. ACOUSTICS

# **Description:**

- Sound, basic properties
- Origin of sound
- Nature of sound in the air
- Media that transmit sound
- Resonance, Interference
- Fourier analysis

### **Related activities:**

- Theoretical classes with resolution of practical exercises in the classroom
- Practical activities in small groups

**Full-or-part-time:** 33h Theory classes: 6h Practical classes: 4h Guided activities: 3h Self study : 20h

#### **5. GEOMETRY OF SPACE**

### **Description:**

- Spatial parameterization in 2D and 3D
- Geometry and geometric relationships
- Introduction to graphic design

### **Related activities:**

- Theoretical classes with resolution of practical exercises in the classroom
- Practical activities in small groups

# Full-or-part-time: 20h

Theory classes: 3h Practical classes: 1h Guided activities: 1h Self study : 15h



# **GRADING SYSTEM**

The grade for the subject will be obtained following a continuous evaluation system. Two (2) written tests will be carried out during the course (First midterm and Final exam) and two (2) projects applied in groups. The weight of each part is as follows:

- Midterm Exam: 25%
- Project 1: 20%
- Project 2: 20%
- Final Exam: 25%
- Participation and learning attitude: 10%

Passing is obtained by achieving a grade of 5 in the final grade weighted according to the previous criteria. If a test is not submitted, it will obtain a grade of zero (0).

If the subject is not passed, there is the possibility of taking a re-evaluation exam, whose grade will replace the exam grades. The maximum grade for the subject, if approved through re-evaluation, will be 5.

Irregular actions that may lead to a significant variation in the grade of one or more students constitute a fraudulent performance of an evaluation act. This action will lead to a descriptive grade of fail and a numerical grade of 0 for the ordinary global assessment of the subject, without the right to re-evaluation.

If the teachers have evidence of the use of AI tools that are not permitted in the assessment tests, they may summon the students involved to an oral test or a meeting to verify the authorship.

# BIBLIOGRAPHY

#### **Basic:**

- Tipler, Paul Allen; Mosca, Gene. Física para la ciencia y la tecnología . 6a ed. Barcelona : Reverté, 2010. ISBN 9788429144284.

#### **Complementary:**

- Reas, Casey; Fry, Ben. Processing : a programming handbook for visual designers and artists . 2nd edition. Cambridge, Massachusetts : MIT Press, cop. 2014. ISBN 9780262028288.

- Rossing, Thomas D; Wheeler, Paul; Moore, F. Richard. The Science of sound . 3rd ed. San Francisco [etc.] : Addison Wesley, cop. 2002. ISBN 0805385657.

# RESOURCES

#### **Other resources:**

Website: Física con ordenador. Autor: Ángel Franco: <u>http://www.sc.ehu.es/sbweb/fisica/default.htm</u> />
Programmable creation and modeling tool: <u>https://ccl.northwestern.edu/netlogo</u>