

## 804022 - FIS-M - Physics

Coordinating unit: 804 - CITM - Image Processing and Multimedia Technology Centre  
 Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre  
 Academic year: 2019  
 Degree: BACHELOR'S DEGREE IN MULTIMEDIA STUDIES (Syllabus 2009). (Teaching unit Compulsory)  
 ECTS credits: 9 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: Quintero Quiroz, Carlos Alberto

### Degree competences to which the subject contributes

Specific:

4. (ENG) Capacitat de resolució de problemes mitjançant sistemes diversos: analítics, numèrics, simulació per ordinador.
5. (ENG) Aprenentatge en la cerca i verificació de la informació.
6. (ENG) Comprendre els fenòmens físics bàsics per les tecnologies multimèdia i fotogràfiques.
7. (ENG) Comprendre i aplicar coneixements relacionats amb: la formació de les imatges en els instruments de captació; amb la il·luminació en entorns reals i virtuals; amb els mecanismes que regeixen la il·luminació i els colors naturals i els paràmetres que la caracteritzen; amb l<sub>2</sub>acústica arquitectònica, els ultrasons i la acústica submarina; amb el funcionament de pantalles i monitors.
8. (ENG) Comprendre el funcionamiento básico de los circuitos eléctricos y electrónicos que forman los sistemas audiovisuales.

### Teaching methodology

(ENG)

### Learning objectives of the subject

(ENG) En acabar l'assignatura l'estudiant o estudianta ha de ser capaç de:  
 Comprendre el funcionament de les tecnologies bàsiques en Multimèdia i en Fotografia i Creació Digital, així com de les tècniques específiques de Matemàtiques i Programació que calen per entendre els conceptes de Física.

### Study load

Total learning time: 225h	Hours large group:	0h	0.00%
	Hours medium group:	90h	40.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	135h	60.00%



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### Content

(ENG) FONAMENTS CIENTIFICS I MATEMÀTICS	Learning time: 10h Practical classes: 3h Laboratory classes: 2h Self study : 5h
Description: - Introduction and revision of fundamental concepts of physics and mathematics: - Magnitude, units and dimensions, significant figures, scientific notation and orders of magnitude. - Coordinate systems and relative position. - Basic concepts in vector and differential calculus.	
(ENG) CINEMÀTICA i MECÀNICA	Learning time: 30h Practical classes: 9h Laboratory classes: 6h Self study : 15h
Description: - Description of the movement in 2D: - Description of the linear and circular movement under the action of forces: - Description of work, energy and physical concepts derived. - Description of the kinematics in shock conditions in 1D and 2D	
(ENG) OSCIL·LACIONS I ONES	Learning time: 30h Practical classes: 9h Laboratory classes: 6h Self study : 15h
Description: - Basic concepts of oscillatory movement - Oscillatory movement: Waves. - Simple Harmonic.	

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<p>(ENG) ACÚSTICA</p>	<p>Learning time: 10h Practical classes: 5h Self study : 5h</p>
<p>Description:</p> <ul style="list-style-type: none"> <li>- Sound, basic properties.</li> <li>- Origin of sound</li> <li>- Nature of sound in the air</li> <li>- Media that transmit sound</li> <li>- Resonance, Interference</li> <li>- Fourier analysis.</li> </ul>	
<p>(ENG) ELECTROMAGNETISME</p>	<p>Learning time: 30h Practical classes: 9h Laboratory classes: 6h Self study : 15h</p>
<p>Description:</p> <ul style="list-style-type: none"> <li>- Electrostatics. Electric charge Coulomb law.</li> <li>- Field and electric potential.</li> <li>- Magnetism: field and magnetic force.</li> <li>- Electromagnetic induction</li> </ul>	
<p>(ENG) TEORIA DE CIRCUITS</p>	<p>Learning time: 30h Practical classes: 9h Laboratory classes: 6h Self study : 15h</p>
<p>Description:</p> <ul style="list-style-type: none"> <li>- Electric current, electrical resistance.</li> <li>- Continuous current.</li> <li>- Ohm's law.</li> <li>- Electrical circuits, in series, in parallel.</li> <li>- Multiple mesh circuits. Kirchhoff's laws.</li> </ul>	

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(ENG) ÒPTICA	Learning time: 10h Practical classes: 5h Self study : 5h
Description: <ul style="list-style-type: none"> <li>- Properties of light</li> <li>- Reflection and refraction</li> <li>- Glasses</li> <li>- Image formation by a lens</li> <li>- Defects of the lenses</li> </ul>	
(ENG) TEORIA DEL COLOR	Learning time: 10h Practical classes: 5h Self study : 5h
Description: <ul style="list-style-type: none"> <li>- Vision of light: the eye</li> <li>- Mix of colored lights</li> <li>- Mix of colored pigments</li> <li>- Chromaticity diagrams.</li> </ul>	

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### Planning of activities

THEORY CLASSES AND PROBLEMS	Hours: 68h 20m Self study: 13h 20m Theory classes: 55h
Description: Theoretical classes in which new concepts, their application and exercises are combined.	
PRACTICAL EXERCISES	Hours: 30h Self study: 30h
Description: Compendium of exercises related to each of the blocks of the subject	
COMPUTER PRACTICES	Hours: 30h Self study: 30h
Description: Computer practices related to the different theoretical blocks of the subject.	
INDIVIDUAL EVALUATION TESTS	Hours: 20h 40m Theory classes: 4h Self study: 16h 40m
Description: Partial and finals exams	

### Qualification system

The qualification of the subject will be obtained following a system of continuous evaluation. There will be written tests during the course (Partial), six (6) short tests (TE) and four (4) computer practices (T) to be delivered and a final exam. The weight of each part is as follows:

- Partial Exam - 15%
- Final Exam - 30%
- Tests - 30%
- Computer practices - 15%
- Participation and attitude of learning - 10%

The pass is obtained by achieving a grade of 5 in the final grade weighted according to the previous criterion. If a test or test is not presented, it will get a grade of zero (0).

If the subject is not passed, there is the possibility of taking a re-evaluation exam, the note of which will substitute the exam and test scores. The maximum mark of the subject, if it is approved through the re-evaluation, will be a 5.

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### Regulations for carrying out activities

#### Exercises in class:

During the theoretical classes, students will perform problems that will be discussed and resolved in the same class. These exercises will serve as a practice to perform the Tests (individual).

#### Tests (TE):

Every two weeks (approximately) short tests will be carried out through the Virtual Campus.

#### Computer practices (T):

The computer laboratory practices must be submitted within the indicated periods, in pdf format. The complementary material (Excel, Matlab, Phyton) should also be delivered, if applicable.

### Bibliography

#### Basic:

Tipler, P.A.; Mosca, G. Física para la ciencia y la tecnología. 6ª ed. Barcelona: Reverté, 2010. ISBN 9788429144284.

Giró i Roca, A. (coord.). Física per a estudiants d'informàtica. Barcelona: Fundació per a la Universitat Oberta de Catalunya, 2005. ISBN 8497881443.

Shiffman, Daniel. The nature of code: simulating natural systems with processing. Magic Book Project, 2012. ISBN 9780985930806.

Bourg, David M. Physics for game developers. 2nd ed. Beijing: O'Reilly, 2013. ISBN 9781449392512.

#### Complementary:

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

Rossing, T.D.; Moore, F.R.; Wheeler, P.A. The science of sound. 3rd ed. San Francisco, CA: Addison Wesley, 2002. ISBN 0805385657.

#### Others resources:

##### Hyperlink

Web de Processing

<http://www.processing.org>