

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

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 Optional)  
ECTS credits: 6 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: Barrière Figuerola, Lali

### Degree competences to which the subject contributes

Specific:

5. (ENG) Aplicar nous coneixements teòrics i pràctics, relacionats amb la creació de continguts i aplicacions interactives multimèdia orientades al seu ús als àmbits de: la formació, la salut, l'oci o l'entreteniment i els negocis i activitats professionals.
3. (ENG) Analitzar l'evolució i l'estat de l'art i identificar probables i/o desitjables escenaris futurs, de l'aplicació de les tecnologies multimèdia als àmbits de: la formació, la salut, l'oci o l'entreteniment i els negocis i activitats professionals.

Transversal:

1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
4. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

### Teaching methodology

It is a practical subject. The basis of the work is the programming in Processing ([www.processing.org](http://www.processing.org)).

In each session of two hours several aspects of the programming of graphics and generative visuals will be combined:

- 1 - A part of the class is explanatory, always based on practical application. This part will deal with:
  - \* Generative techniques and methods. Generative strategies ranging from the use of randomness to physical simulation or the generation of patterns (according to the agenda).
  - \* Analysis, from the creative point of view (conceptual and aesthetic) of some works that use the techniques presented. I study some cases from the point of view of professional applications.
  - \* Programming. Knowledge and skills necessary for the successful implementation of generative methods (for example, object orientation, use of specific data structures).
- 2 - A part of the class is purely practical, with a part of sharing results:
  - \* Students develop their exercises individually.
  - \* On a voluntary basis, students can show their work to the rest of the class.
  - \* In addition to the technical aspects, aesthetic aspects that allow the expression of creativity will be taken into account.
- 3 - During the first weeks evaluable practices will be delivered. From the middle of the four-month period, work will be done on the final project.

### Learning objectives of the subject

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

1. Know the different areas of use of multimedia technologies, in relation to training, health, leisure or entertainment and, business and professional activities.
2. Correctly apply the theoretical and practical knowledge in the development of exercises, problems, practices or projects related to the multimedia production in the fields of training, health, leisure or entertainment and business and professional activities.
3. Apply the knowledge gained to the completion of a task based on relevance and importance, deciding how to complete it and the time it takes to dedicate and selecting the most appropriate sources of information.
4. Plan and use the information necessary for academic work based on a critical reflection on the information resources used.
5. Communicate clearly and efficiently in oral and written presentations adapted to the type of audience and the objectives of the communication using appropriate strategies and means.
6. Take into account the social, economic and environmental dimensions when applying solutions and complete projects consistent with human development and sustainability.

### Study load

Total learning time: 150h	Hours large group:	0h	0.00%
	Hours medium group:	60h	40.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

### Content

<p>1. What does generative mean</p>	<p>Learning time: 5h Practical classes: 2h Self study : 3h</p>
<p>Description: Introduction to the course, with emphasis on the meaning of the word "generative".</p> <p>Related activities: (1) Explanatory class (2) E01: Deliverable practice.</p> <p>Specific objectives: 1.1 Definitions, history and examples 1.2 Processing and the "Generative Design" project 1.3 Other languages and tools for creative programming</p>	
<p>2. Programming in Processing</p>	<p>Learning time: 15h Practical classes: 6h Self study : 9h</p>
<p>Description: Acquisition of basic knowledge of the Processing language.</p> <p>In this topic we will review the basic tools that will allow us to start working. We will do two simple practices that we will focus from the beginning as an exercise in creation, not just programming.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices (3) E01: Deliverable practice. (4) Project 1 and project 2.</p> <p>Specific objectives: 2.1 Drawing primitives, drawing parameters 2.2 Animation and interaction 2.3 Import images 2.4 Bookstores 2.5 Output Formats</p>	

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

<h3>3. Generative graphics and animations</h3>	<p>Learning time: 25h Practical classes: 10h Self study : 15h</p>
<p>Description: Shape, color and randomness in the generative strategy. Object Oriented Programming.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) E02: Deliverable practice. (4) Project 1 and project 2.</p> <p>Specific objectives: 3.1 Encode shape and color 3.2 Randomness and near-randomness 3.3 Intuitive rules systems (mathematical formulas, games, geometry, ...) 3.4 Programming: object orientation, ArrayList and other data structures</p>	
<h3>4. Geometric abstraction. Patterns</h3>	<p>Learning time: 20h Practical classes: 8h Self study : 12h</p>
<p>Description: Rules based on geometric objects and their properties. Strategies for the generation of geometric patterns.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) E03: Deliverable practice. (4) Project 1 and project 2.</p> <p>Specific objectives: 4.1 Transformation and repetition 4.2 Subdivision 4.3 Oscillation</p>	

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

<p>5. Generative typography</p>	<p>Learning time: 20h Practical classes: 8h Self study : 12h</p>
<p>Description: Working with typography in Processing.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) E04: Deliverable practice. (4) Project 1 and project 2.</p> <p>Specific objectives: 5.1 Letters as geometric objects 5.2 Typeface animation 5.3 The Geomerative Library</p>	
<p>6. Forces and particles systems.</p>	<p>Learning time: 25h Practical classes: 10h Self study : 15h</p>
<p>Description: Programing Newtonian forces, as a means to control motion and interactionbetween the elements of the animation.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) Project 1 and project 2.</p> <p>Specific objectives: 6.1 Forces: Newton's laws, friction, resistance, gravitational attraction 6.2 Oscillations 6.3 The Box2D and Toxiclib Verlet Physics libraries</p>	

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

<p>7. Interaction</p>	<p>Learning time: 20h Practical classes: 8h Self study : 12h</p>
<p>Description: Audio, camera and detection, MIDI.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) Project 1 and project 2.</p> <p>Specific objectives: 7.1 Audio 7.2 Detection with the camera 7.3 MIDI controllers</p>	
<p>8. Data visualization</p>	<p>Learning time: 20h Practical classes: 8h Self study : 12h</p>
<p>Description: Introduction to data visualization in Processing. Generate graphics from data with an aesthetic and creative goal. Distinguish this approach from the scientific use of data, which allows to extract and represent information from big data sets.</p> <p>Related activities: (1) Explanatory class (2) Non-deliverable practices. (3) Project 1 and project 2.</p> <p>Specific objectives: 8.1 Data display 8.2 Functionality and aesthetics 8.3 Acquisition, parsing and filtering of data 8.4 Maps 8.5 Interactive data representation 8.6 Data as a generative strategy</p>	

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

### Planning of activities

Exercices	Hours: 34h 30m Practical classes: 15h 30m Self study: 19h
<p>Description:</p> <p>Starting from topic 2, in each topic one or more practical exercises will be proposed, to be carried out partly during class and partly outside of class hours, some of which must be submitted to be part of the final grade. The non-deliverable exercises will serve to fix the learning and achieve the necessary knowledge to perform the deliverables and the project.</p>	
Assignments	Hours: 35h 30m Practical classes: 10h 30m Self study: 25h
<p>Description:</p> <p>Deliverables will be part of the final grade: there are 4 throughout the course that are worth 10% each.</p> <p>Topic 2: E01 Topic 3: E02 Topic 4: E03 Topic 5: E04 Topics 6, 7 and 8, which will be explained in parallel to the development of the project, do not have deliverables.</p>	
Project 1	Hours: 13h Self study: 2h Practical classes: 11h
<p>Description:</p> <p>Students will make a first, individual project, which will be worth 20% of the final grade. It will be delivered in two parts, a first installment towards week 6, and a second delivery at the end of the semester. It will try to program a parameterized generative graph, with the control of parameters through the controlP5 library.</p>	
Project 2	Hours: 50h 30m Practical classes: 15h 30m Self study: 35h
<p>Description:</p> <p>The second project, which is worth 20% of the final grade, is a controlled animation with a MIDI controller that allows you to interpret live visuals accompanying a song, chosen by the student. The work has an important individual art, but the set of animations must function as a global application, which allows the change of song and the interpretation, in the order you want, of the animations.</p>	
Explanatory class	Hours: 16h 30m Practical classes: 16h 30m

## 804129 - BETMA5-M - Specialization Block in Applied Multimedia Technologies V

### Description:

In each session, part of the time will be devoted to the explanation of generative techniques and methods, the study of some examples from generative art, and the presentation of some advanced programming techniques.

### Qualification system

The final grade of the subject will be calculated from the following weights:

Attitude and participation: 10%

Class notes and deliveries: 50%

Individual work grade: 20%

Joint work note: 20%

### Bibliography

#### Basic:

Shiffman, Dan. The nature of code. [S.l.]: l'Autor, 2012. ISBN 9780985930806.

Bohnacker, Hartmut [et al.]. Generative design. New York: Princeton Architectural Press, 2012. ISBN 9781616890773.

Shanken, Edward A. Art and electronic media. London: Phaidon Press, 2009. ISBN 9780714868585.

Greenberg, Ira; Xu, Dianna; Kumar, Deepak. Processing: creative coding and generative art in processing 2. Berkeley: Apress, 2013. ISBN 9781430244646.