UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Course guide
804042 - EII-M - Image Structure and Lighting

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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 MULTIMEDIA STUDIES (Syllabus 2009). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Martínez Navarro, Beatriz

Others: De Matthaeis, Francisco

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
4. Apply knowledge related to the creation and recording of photographic images.

5. Apply knowledge related to lighting in real and virtual environments.
6. Be able to illuminate real and/or virtual scenes in the way determined by aesthetic, descriptive or narrative conditions.

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.
3. 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

Class sessions of two hours are divided, in general, into four areas of activity:
1. Resolution of doubts regarding the exercises proposed in the previous session.
2. Explanation and defense of the exercises resolved.
3. Acquisition of new knowledge.
4. Explanation of the next exercise and complementary materials.
These areas of activity are modulated based on the complexity of the exercises and the corresponding contents.

LEARNING OBJECTIVES OF THE SUBJECT

1. Solve problems of camera adjustment and real or virtual lighting for given situations.
2. Choose image capture instruments with the design and features appropriate to a given situation.
3. Solve image processing problems based on the application of the images.
4. Communicate clearly and efficiently in oral and written presentations adapted to the type of public and the objectives of the communication using the appropriate strategies and means.
5. Plan and use the information necessary for an academic work based on a critical reflection on the information resources used.
6. Use strategies to prepare and carry out oral presentations and write texts and documents with consistent coherent content, structure and style, and a good spelling and grammar level

STUDY LOAD

Type	Hours	Percentage
Hours medium group	60,0	40.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Topic 1 - Structure of the image

Description:
1. Concept of structure of the image
2. Formation of the image
3. Characteristics of the image introduced by the optics
4. Concept of focal length
5. Conjugated object and conjugate image
6. Images for capturing images

Related activities:
Exercices of project P01.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Topic 2 - Contents and shape of image

Description:
1. Relative positions of object and image
2. Side increase and translation of the form
3. Relative sizes
4. Perception of rectilinear forms
5. Perception of curved forms
6. Alternatives to the translation of the form

Related activities:
Exercices of project P01

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Topic 3 - Sharpness of image

Description:
1. Concept of sharpness
2. Circle of minimum confusion and tolerance circle
3. Depth of field
4. Depth of focus
5. Alternatives to the position of the sharpness plan
6. Focus on the image

Related activities:
Exercices of project P03

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Topic 4 - Lighting and narrative

Description:
1. Light and drama
2. Light moments: outdoor, studio and creative light
3. Interior lighting
4. Portrait lighting
5. Lighting of objects

Related activities:
Exercices of project P02

Full-or-part-time: 20h
Theory classes: 8h
Self study : 12h

Topic 5 - Relationships between illuminants, luminaires and objects

Description:
1. Types of luminaires
2. Natural light; parameters that characterize it
3. Characteristics of the subject in relation to lighting
4. Effective size of a light source
5. Own shadows, projected and concept of Falloff
6. Light and shadow in the composition of the image
7. Range of brightness in the scene and high dynamic range images

Related activities:
Exercices of project P01

Full-or-part-time: 40h
Theory classes: 16h
Self study : 24h

Topic 6 - Lighting of scenes and virtual objects

Description:
1. Lighting tools in 3D software
2. Materials and textures
3. Lights, render and computer resources
4. Global lighting
5. Post-production

Related activities:
Exercices of project P02

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

Topic 7 - Photomontage and integration

Description:
- Pre-production photomontage and CGI / real image integration
- Integrate lights and environments
- Image quality
- Processing for optimization of the real image
- Post-production CGI image for integration

Full-or-part-time: 30h
Theory classes: 12h
Self study : 18h

ACTIVITIES

(ENG) EXERCICE P01 - Recreation of pictorial works in real image and in CGI

Description:
Practice P01 consists of the search and recreation of two pictorial works that the student thinks he can reproduce in terms of lighting and structure of the image.

Specific objectives:
- To know how to apply the concepts of image structure and lighting worked in class and in previous courses, depending on the type of image you want to obtain.
- To know how to work the concepts explained in class, both in still image and in computer generated image.

Material:
Description of project GM_EII_P01

Related competencies :
CEM 5.3a. Be able to illuminate real and/or virtual scenes in the way determined by aesthetic, descriptive or narrative conditions.

CEM 5.2a. Apply knowledge related to lighting in real and virtual environments.
CEM 5.1a. Apply knowledge related to the creation and recording of photographic images.

04 COE. 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.
06 URI. 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.
07 AAT. 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.

Full-or-part-time: 12h 30m
Practical classes: 2h 30m
Self study: 10h

EXERCICE P02 - Light and narrative I

Description:
This practice will consist of making two images of the same object, each with a different lighting and image structure: one per catalog and one more creative.

Specific objectives:
1. Learning the use of luminaires in the lighting of a photographic scene.
2. Learning the light / shadow relationships to obtain iconographic information about objects in a photographic scene.
3. Identification of the descriptive differences of the visual forms of an object according to the lighting process used.

Material:
Description of project GM_EII_P02

Related competencies :
CEM 5.2a. Apply knowledge related to lighting in real and virtual environments.
CEM 5.3a. Be able to illuminate real and/or virtual scenes in the way determined by aesthetic, descriptive or narrative conditions.

CEM 5.1a. Apply knowledge related to the creation and recording of photographic images.

06 URI. 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.
07 AAT. 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.
04 COE. 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.

Full-or-part-time: 25h
Practical classes: 5h
Self study: 20h

PRACTICE P03 -Light and narrative II

Description:
This practice will consist of making three images of the same scene, each with a different lighting. It will be analyzed how the use of different lighting schemes can influence at the narrative level.

Specific objectives:
1. Learning the use of luminaires in the lighting of a photographic scene.
2. Learning the light / shadow relationships to obtain iconographic information about objects in a photographic scene.
3. Identification of the descriptive differences of the visual forms of an object according to the lighting process used.

Material:
Description of project GM_EII_P03

Full-or-part-time: 14h
Practical classes: 2h
Self study: 12h

FINAL PROJECT

Description:
The project will consist of obtaining a series of images from the integration of CGI elements in photographic images. It will be carried out following the following structure of production: description of the idea, search and analysis of references, decision-making on the aesthetics of the images, pre-production, production and post-production.

Material:
GM_EII_Project order form

Full-or-part-time: 28h
Practical classes: 4h
Self study: 24h

GRADING SYSTEM

3 exercises that will be developed during the course: 40%
Partial exam: 15%
Final work: 35%
Participation and learning attitude: 10%

Students who do not pass the subject through continuous assessment will have the option to take the re-assessment exam. With this exam it will be possible to re-evaluate the partial exam and the report of the final work (25% of the note of the subject).

EXAMINATION RULES.

Practices:
The practice exercises begin during the class hours in the band assigned to this and are completed outside the class schedule hours following the instructions given in the corresponding Practice Sheet document and the indications that to such effect have been given in the part of the corresponding class.

The evaluation of the practices does not only involve the resolution of the exercises proposed and the projects, but also the defense of the results when the student is required to do so at the beginning of the classes.

Any incident that does not allow to solve the practices within the indicated term will be communicated to the corresponding professor by means of message by the Virtual Campus; After this communication, the relevance or not of any cause that motivates the non-presentation of the exercise will be resolved and the alternatives will be established to complete the evaluation if the causes are justified. The reasons for non-presentation of exercises that are communicated to the faculty by the Head of Studies will also be considered justified.

Exams:
The examinations will be done by electronic document that the student must complete.
The questions and problems proposed in the exams refer to both the theoretical content of the subject and the exercises solved in the different practices. Apart from each question or problem, the contribution in points to the total mark of the exam consists.
Revisions and / or claims regarding exams will be made exclusively on the dates and times established in the Academic Calendar.

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