DIGITAL IMAGE

1. SUBJECT DESCRIPTION:

“Digital Image” is taught during the first semester of First Year and it is continued by “Virtual Space”, taught during the second semester.

“Digital Image”, belongs to those classes which focus on digital technologies with the aim of conceptualizing and implementing such technology as design tool. Its goal is to introduce the student to the process that blends analysis and genesis of the architectural artifact by means of the wide array of digital techniques that have opened up to architects in the recent years.

Digital technology, as the catalyst of a new cultural paradigm, plays a crucial role in the re-definition that the architectural discipline is experiencing today. During the last two decades of the 20th-century, digital platforms were introduced into architecture thus generating new forms of production, conception and expression, either in autonomous formats or intersecting with more traditional disciplines and tools.

The role of digital technology was at first limited to the representation and reproduction of traditional systems, limiting it to its instrumental character and ignoring the potential for new methodologies and epistemological consequences that such a technological revolution entails.

However, during the three last decades, and due to its constant and rapid evolution, this situation has radically changed. Current methods of design implement non-linear systems, complex and associative geometries, allowing for the capacity to manage large amounts of information in a simultaneous manner, thus allowing the user to visualize and organize these processes in a consistent way, not only for the architect but for every agent involved in the construction process. Digital processes can today control every step from concept to the automated fabrication of its components.

It is the aim of this class to study those cultural paradigms that have appeared as consequence of the most important revolution since the industrial era in the production of architecture.

2. OBJECTIVES

2.1. Objectives and General Competences (ORDEN ECI/3856/2007.BOE 312)

Conceptual Goals/ Adequate and proper application of architectural knowledge

- To acquire proficiency in spatial representation systems
- Analysis and Theory of Form and laws of visual perception
- Graphic orthographic techniques, scientific restitution
- Applied graphic means for the representation of objects and spaces
- To properly conceive and represent the visual attributes of objects, the laws of proportion and their subsequent information technology (IT) techniques.

Results of the Learning Process:

In respect to competence 1: “To acquire specific knowledge on: “Spatial Representation Systems”. It is intended for the student to increasingly achieve higher dominion of the skills required to demonstrate in a creative manner the knowledge of spatial representation systems.

In respect to competence 2: “To acquire specific knowledge on: the analysis and theory of Form and the laws of visual perception”. It is intended for the student to properly achieve a practical and correct application of the theoretical concepts of the analysis and theory and the laws of visual perception in the representation of architecture.
In respect to competence 3: “To acquire specific knowledge on: Graphic orthographic techniques in every phase of the architectural project.” It is intended for the student to achieve to notable standards the ability to apply with precision the proper Graphic orthographic techniques in every phase of the architectural project.

In respect to competence 4: “To apply the graphic means for the representation of spaces and objects” (T). It is intended that the student achieves high proficiency in: justifying his/her capacity to apply the various graphic means for the representation of spaces and objects in an expressive manner.

In respect to competence 5: “To acquire specific knowledge on the techniques of transmission of ideas: graphic, written and theoretical.” It is intended that the student achieves high proficiency in: the control and use of the graphic, written and theoretical techniques as part of the learning of the basic knowledge of architecture.

2.2. Objectives and specific competences

Conceptual objectives:

- Understanding of the formal, methodological and aesthetical characteristics derived from the application of digital technologies in the framework of architecture and contemporary artistic practices.
- Development of a critical sensitivity for the inherent bias and nature of each deployed digital medium.
- Knowledge and use of the relational organization of the abstract systems that digital systems are capable of producing, as well as its use as information management tools and its applications in the field of architectural design.
- Introduction to the narrative tools associated with description and understanding of the environment and its spatial features.
- Introduction to critical analysis of studio work. Development of complex conceptual constructions, both individually and in groups.
- Abilities oriented to improve individual and collective performance in studio environments.

Professional skills:

This course should allow the student to gain competences in the following professional fields:

- Creative conceptual design environments (and most specifically those related with the production of architecture).
- Parametric three-dimensional environments programming. Synthesis of digital visual contents (both static and animated).
- Disciplines based in digital spatial visualization (virtual reality, hyperspace...)

Learning results:

- Ability to conceptually develop, produce and narrate design exercises of a mainly visual, spatial and architectural nature, by means of three-dimensional digital tools.
- Ability to critically evaluate such designs, as well as the methodologies and tools that inform them.
- Ability to develop individual criteria regarding the opportunistic use and combination of several digital tools during conceptual design, production and narration processes.

3 CONTENTS

Introduction to digital culture and its effects within the architectural discipline

   a) Tools/ Software:
   Acrobat, Powerpoint, Photoshop, www, web 2.0: wiki, blog, flickr, blogspot, etc.

   b) Concepts:
   - Foundations, origins and development of Digital culture.
   - Information Languages, file formats, databases, workflows, conversions, plug-ins, fabbers.

   c) Techniques:
   - Format transformations and variations. Numeric and qualitative relations.
   - Data compilation (dynamic-databases)
Exercise _01: Ben Fry, Casey Reas, Marius Watz,

a) Tools/ Software:
Processing, vimeo, blogging, googling, Adobe CS3, Rhinoceros, Autocad.

b) Concepts:
- Concept of bits, pixel, vector.
- Notions of resolution and scale within digital environment. (pixel-bit-point-vector).
- Morphologic analysis. Informed geometries.

c) Techniques:
- Registration and data transformation in digital systems. Relational database.
- Editing processes: bits-pixel-point-vector.
- Diagrams and geometric transformations.
- Numeric Variations.

Exercise _02: Marius Watz, Evan Dougllis.

a) Tools/ Software:
Adobe CS3, Rhinoceros, Autocad, Vray..

b) Concepts:
- Bi-dimensional representation of a three dimensional body.
- Unfolding of Single Surface Geometries.
- Geometric Systems of tessellation and subdivision.

c) Techniques:
- Advanced editing of vector systems.
- Texturing, cutting and folding techniques.
- Interfaces and transformation between virtual and physical environments.

4: METHODOLOGY AND ECTS LOAD

The learning method will be based in a Studio system that will integrate theoretical lectures, technical training, the individual work of each student, and the public revision and criticism of such work. All of these activities will sequentially take place in a specific space, and will be framed into a flexible pedagogic organization.

The instructor will give short lectures regarding the most relevant aesthetical and methodological aspects of each unit. Additionally, he/she will provide and comment diverse examples that illustrate the specific design applications of such aspects. He/she will also provide an initial training on the most relevant digital tools of each unit, in order to allow the student to personally start developing the individual skills needed to fulfill the requirements of the course.

The instructor will propose two specific design assignments during the course, which will address the topics covered prior and during the development of each assignment. The students will fulfill the requisites of these exercises by using the specific design methodologies and tools explained in each unit.

During the development of such assignments, the students will repeatedly give public, informal presentations of their work in process. The instructor will give advice, commentaries and corrections, both individual and directed to the whole group. This is intended to produce a framework of critic dialog among all the individuals on the group, which should lead to a global improvement of the technical and conceptual richness of the design proposals. Thus, participation of the students in such dialog is expected and highly encouraged.

After this development process, a final presentation will be produced. In unit 4, the student will produce a final presentation based on the revision and improvement of the last assignment, structured in a narrative manner.
We highly recommend the use of a laptop in class, Wi-Fi connection needed. In any case, the use of Wi-Fi for activities not related to this class will hinder the student's grade on participation.

5-EVALUATION SYSTEM

Evaluation is continuous. This implies that all work produced by the students along the semester will be evaluated. Also, mature critic contributions to the framework of the collective work environment will be taken into account. Critic, technical and conceptual progression of the student along the course will be a basic element of judgment.

First examination session

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Criteria</th>
<th>Instrument</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance and participation</td>
<td>-Active participation during class and programmed activities</td>
<td>Observation and notes from the professor</td>
<td>10%</td>
</tr>
<tr>
<td>Base Concepts and specific Software Skills</td>
<td>-Knowledge and command of the technical and conceptual aspects of the course.</td>
<td>Reflected in the submitted assignments</td>
<td>45%</td>
</tr>
<tr>
<td>Assignments</td>
<td>-Submission of the given assignments -Correct graphical and conceptual arrangement of the submitted assignments.</td>
<td>Intermediate and final submission of assignments</td>
<td>45%</td>
</tr>
</tbody>
</table>
VIRTUAL SPACE

1- SUBJECT DESCRIPTION:

“Virtual Space” focuses on digital technologies with the aim of conceptualizing and implementing them as design tools. This course is conceptually and technically linked with “Digital Image”, which is offered during the first semester, and as such, it continues and evolves on its methodology and intent.

Contemporary digital tools have led to an enormous paradigm shift with direct impact on both the generation as well as the fabrication of architectural space. Hence, the course’s aim is to expand the student's knowledge of digital modeling and fabrication techniques. It is therefore expected to emphasize the relevant advantages of such tools over classical physical models, especially when working with complex, non-standardized forms -such as those derived from the use of NURBs geometries (Non-Uniform Rational B-splines) and generative software.

Students are expected to deepen the knowledge introduced during Digital Image, and to become literate in the everyday use of the wide range of possibilities that the use of digital technologies provides in terms of conceptual development, description and construction. Students will also make direct use of CAD/CAM/CAE production and fabrication techniques allowing them to physically plan and materialize their digitally-developed prototypes at its largest possible scale (1:1).

Finally, Virtual Space will offer a chance for students to develop their own understanding of tooling and space. The subject will foster individual and team-based collaboration that seeks personal excellence by building up on personal interest and research paths. Students will then write their own tools, hence becoming masters of their own cultural world.

2- OBJECTIVES

2.1. Objectives and General Competences (Conceptual Goals/ Adequate and proper application of architectural knowledge

- To acquire proficiency in spatial representation systems
- Analysis and Theory of Form and laws of visual perception
- Graphic orthographic techniques, scientific restitution
- Applied graphic means for the representation of objects and spaces
- To properly conceive and represent the visual attributes of objects, the laws of proportion and their subsequent information technology (IT) techniques.

Results of the Learning Process:

In respect to competence 1: “To acquire specific knowledge on: “Spatial Representation Systems”. It is intended for the student to increasingly achieve higher domain in the skills required to demonstrate in a creative manner the knowledge of spatial representation systems.

In respect to competence 2: “To acquire specific knowledge on: the analysis and theory of Form and the laws of visual perception”. It is intended for the student to properly achieve a practical and precise application of the theoretical concepts of the analysis and theory and the laws of visual perception in the representation of architecture.

In respect to competence 3: “To acquire specific knowledge on: Graphic orthographic techniques in every phase of the architectural project:” It is intended for the student to achieve to notable standards the ability to apply with precision the proper Graphic orthographic techniques in every phase of the architectural project.

In respect to competence 4: “To apply the graphic means for the representation of spaces and objects” (T). It is intended that the student achieves high proficiency in: justifying his/her capacity to apply the various graphic means for the representation of spaces and objects in an expressive manner.

In respect to competence 5: “To acquire specific knowledge on the techniques of transmission of ideas: graphic, written and theoretical.” It is intended that the student achieves high proficiency in: the control and use of the graphic, written and theoretical techniques as part of the learning of the basic knowledge of architecture.
2.2. Objectives and specific competences

Conceptual objectives:

- Understanding of the formal, methodological and aesthetical characteristics derived from the application of digital technologies in the framework of architecture and contemporary artistic practices.
- Development of a critical sensitivity for the inherent bias and nature of each deployed digital medium.
- Knowledge and use of the relational organization of the abstract systems that digital systems are capable of producing, as well as its use as information management tools and its applications in the field of architectural design.
- Introduction to the narrative tools associated with description and understanding of the environment and its spatial features.
- Introduction to critical analysis of studio work. Development of complex conceptual constructions, both individually and in groups.
- Abilities oriented improve individual and collective performance in studio environments.

Professional skills:

This course should allow the student to gain competences in the following professional fields:

- Creative conceptual design environments (and most specifically those related with the production of architecture).
- Parametric three-dimensional environments programming. Synthesis of digital visual contents (both static and animated).
- Disciplines based in digital spatial visualization (virtual reality, hyperspace…)

Learning results:

- Ability to conceptually develop, produce and narrate design exercises of a mainly visual, spatial and architectural nature, by means of three-dimensional digital tools.
- Ability to critically evaluate such designs, as well as the methodologies and tools that inform them.
- Ability to develop individual criteria regarding the opportunistic use and combination of several digital tools during conceptual design, production and fabrication processes.
- Ability to develop customized tools to face particular design problems.
3- CONTENTS (TOTAL: 20 sessions)

3.1- Course Structure

1- Unit 1: Introduction to the course. Theoretical Lecture and Applied Software Examples (1 session)
2- Unit 2: Introduction to advanced presentation techniques (3 sessions)
3- Unit 3: Basic concepts and logics inherent to digitally generated spaces (3 sessions)
4- Unit 4: Complex geometries and material constraints | applied to a self-standing structure (6 sessions)
5- Unit 5: Fabrication and process automation | applied to a self-standing structure (6 sessions)
6- Unit 6: Final Review (2 sessions)

UNIT 1. INTRODUCTION (1 sessions)

a) Tools/ Software:
- Does not apply

b) Concepts:
- Does not apply

c) Techniques:
- Does not apply

d) Time sequence:
   Session 1:
   - Presentation and introduction to the course
   - Brief Lecture and applied software examples
   - Digital fabrication case studies
   - Decisions on team structure
   - Recap of Digital Image
   - Presentation of Exercise 01: animation video and presentation of a virtual space
   - Introduction to render processes

UNIT 2. INTRODUCTION TO ADVANCED PRESENTATION TECHNIQUES (3 sessions)

a) Tools/ Software:
- Rhinoceros
- Python
- VRay for Rhino/Maxwell Renderer
- After Effects

b) Concepts:
- Advanced presentation methodologies
- Animation of construction processes and phasing

c) Techniques:
- Rendering
- Animation
d) Time sequence:
Session 2:  
- Render processes
- VRay setup for abstract presentations
- Introduction to animation strategies in Rhino without Bongo

Session 3:  
- Path animations
- Sun animations
- Extra content: Introduction to animation through scripting
- Mandatory material by students: animation frames and audio

- Session 4:  
- Introduction to Postproduction
- Video vs static images: differences and similarities

UNIT 3. BASIC CONCEPTS AND LOGICS INHERENT TO DIGITALLY GENERATED SPACES (3 sessions)

a) Tools/ Software:
- Rhinoceros
- Python
- Grasshopper + GhPython

b) Concepts:
- Influential aspects of technology in the field of architecture.
- Surface and mesh: differences and relationships
- Output and file export
- STL files: what are they? What are they used for?

c) Techniques:
- STL conversion

d) Time sequence:
Session 5:  
- Informational spaces

Session 6:  
- Grasshopper and scripting integration (I)
  - Adaptive models and critical analysis of multiple design options
  - Use of model previously developed in Digital Image

Session 7:  
- Grasshopper and scripting integration (II)
  - Use of model previously developed in Digital Image
  - Critic Session:
    - presentation of exercise I and design analysis
    - detail development

Workshop 1:  
- Grasshopper (I, 3 sessions)

Workshop 2:  
- Grasshopper (II, 3 sessions)

e) Important notes:
3D Printing and digital fabrication entail a relevant economic dispense. Please take this into account when planning the budget for subject. It is the intention of Virtual Space to minimize economic impact, but there is nevertheless a cost attached to fabrication activities that cannot be avoided. Professor will help students calculate the cost of printing their models and guide them through material optimization opportunities.
UNIT 4. COMPLEX GEOMETRIES AND MATERIAL CONSTRAINTS | APPLIED TO A SELF-STANDING STRUCTURE (6 sessions)

a) Tools/Software:
- Rhinoceros
- Python, Grasshopper + GhPython
- 3DSystems ZCorp 3D Printer

b) Concepts:
- Rapid prototyping
- Development of 3-dimensional complex geometry from diagrams: an iterative process
- Relational geometries
- From diagram to architectural form
- 3D associative principles and interchange formats
- STL files: what are they? What are they used for?
- Prerequisites:
  - Basic knowledge of 2d presentation and 3d modeling

c) Techniques:
- STL conversion
- Three-dimensional spatial dynamic diagrams and protocols
- Advanced 3D Modeling and Digital Fabrication techniques (3d Print+CNC)
- 3D spatial manipulations of 2d diagrams.
- Serialized 3d operations.
- Development of 3d operative protocols.
- File Preparation

d) Time sequence:
Session 8: - Design adaptations to material constraints
  - Extra content: 3D Printing requirements
  - Presentation of exercise 02: real scale model of sculpture structure or inhabitable hull

Session 9: - Coordination with NuDL
  - Visit to FabLab and basic machine exploration

Session 10: - Model development:
  - General form
  - Study of joints
  - Application of scaled details and study diagrams

Session 11: - Presentation of design models
  - Public evaluation of design models: contest

Session 12: - Analysis of selected models
  - Further design refinement

Session 13: - Detail study: fabrication of hull pieces. Scale to be discussed according to model

Workshop 3: - FabLab (3 sessions)

e) Exercise (deliverables):
  - Development of model mock-ups.
    - Initial joint studies
    - Overall form of hull design

UNIT 5. FABRICATION AND PROCESS AUTOMATION | APPLIED TO A SELF-STANDING STRUCTURE (5 sessions)

a) Tools/Software:
- Rhinoceros
- 3DSystems ZCorp 3D Printer, CNC CAM
b) Concepts:
- Prototyping processes
- Iterative processes
- Use of scale to solve spatial problems
- Design of nodes and constructive/structural knots

- Prerequisites:
  - Basic domain of 2d presentation and 3d modeling

c) Techniques:
- CNC fabrication
- Laser cutting fabrication

d) Time sequence:
  Session 14-18: - Studio work
  - Collective problem
  - Collective problem solving
  Workshop 4: - FabLab (3 sessions)

UNIT 6. FINAL REVIEW (2ss)

a) Time sequence:
  Session 19-20: - Preparation of real scale models for public exhibition
  - Model finishing approval: sanding, painting
  - Final review. The final review will exhibit works included in all exercises (virtual animation and real-scale model of hub or sculptural structure), which will be considered for the final evaluation. Student feedback is expected.
3.2- Timeline

<table>
<thead>
<tr>
<th>Unit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

4- METHODOLOGY AND ECTS LOAD

4.1. TEACHING METHOD

The learning method will be based in a Studio system that will integrate theoretical lectures, technical training, the individual work of each student, and the public revision and criticism of such work. All of these activities will sequentially take place in a specific space, and will be framed into a flexible pedagogic organization.

The instructor will give short lectures regarding the most relevant aesthetical and methodological aspects of each unit. Additionally, he/she will provide and comment diverse examples that illustrate the specific design applications of such aspects. He/she will also provide an initial training on the most relevant digital tools of each unit, in order to allow the student to personally start developing the individual skills needed to fulfill the requirements of the course.

The instructor will propose two specific design assignments during the course, which will address the topics covered prior and during the development of each assignment. The students will fulfill the requisites of these exercises by using the specific design methodologies and tools explained in each unit.

During the development of such assignments, the students will repeatedly give public, informal presentations of their work in process. The instructor will give advice, commentaries and corrections, both individual and directed to the whole group. This is intended to produce a framework of critic dialog among all the individuals on the group, which should lead to a global improvement of the technical and conceptual richness of the design proposals. Thus, participation of the students in such dialog is expected and highly encouraged.

After this development process, a final presentation will be produced. In unit 4, the student will produce a final presentation based on the revision and improvement of the last assignment, structured in a narrative manner.

4.2. LEARNING METHOD FOR THE STUDENT /ECTS DISTRIBUTION CHART

The students will progressively improve their knowledge in a mainly practical way. The course is based on the application of the processes and methodologies explained into a given design assignment that will be completed either individually or collectively.

Theory lectures are intended to provide the students with an understanding of the global methodological and aesthetical framework of the course contents, as well as to introduce the students to the necessary technical abilities in the use of digital tools. The student is expected to individually train and improve his or her knowledge in such technical abilities, until a level that permits the application of the proposed methodologies is reached. The instructor will offer advice and solutions to the technical questions that arise during this process.

Students are also expected to progressively improve and correct both the formal and conceptual contents of their proposals, always using a critical and mature approach.

Students are also expected to contribute to and actively participate in the studio environment, either working individually during the course hours, or taking an active role in the critical analysis of both their individual and their fellow students work. This way, the studio should provide with a critical collective environment with the ability to inform the processes and design methodologies that are progressively
developed by the group.

Additionally, a virtual system of communication between the group members and the instructor will be set up. This virtual space can take the shape of a collectively built website or blog, plus the use of Online campus. This space will constitute both a collective communication instrument and a common repository and database of information, findings, techniques and methodologies, aimed at the global enrichment of the learning experience. Both the instructor and the students will critically and actively contribute to this collective database.

<table>
<thead>
<tr>
<th>Teaching Methodology</th>
<th>Percentage</th>
<th>Estimated Student Time Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>(20)%</td>
<td>15 hours</td>
</tr>
<tr>
<td>Discussions</td>
<td>(20)%</td>
<td>15 hours</td>
</tr>
<tr>
<td>Exercises</td>
<td>(56)%</td>
<td>42 hours</td>
</tr>
<tr>
<td>Digital Workshop</td>
<td>(4)%</td>
<td>3 hours</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
<td><strong>75 hours</strong></td>
</tr>
</tbody>
</table>

5-EVALUATION SYSTEM

5.1. GENERAL OBSERVATIONS

Evaluation is continuous. This implies that all work produced by the students along the semester will be evaluated. Also, mature critic contributions to the framework of the collective work environment will be taken into account. Critic, technical and conceptual progression of the student along the course will be a basic element of judgment.

More specifically, both technical and conceptual content of the proposed assignments will be the main evaluation material. Other aspects will introduce corrections in such evaluation.

In order to pass the course, the overall evaluation score of the student should be at least 5.0 points in a scale between 0.0 and 10.0. This overall final score will be an average of the first semester evaluation score and the second semester evaluation score. In order to be able to make an average, each of these partial evaluation scores must also be at least 4.0 points. However, a minimum of 5.0 must be achieved in each part in order to imply the satisfactory completion of the course, and will free up the student from the realization of a final exam.

5.2. EVALUATION AND GRADING CRITERIA

According to the current evaluation policy at IE University, students must pass all courses within a limit of four examination sessions. Because of the different organizational circumstances of such sessions, the evaluation and grading criteria will differ between them.
5.2.1. First examination session.

The students will produce two complete design assignments per semester, which will constitute the primary evaluation material. The submission on time of such assignments is mandatory. It can only be postponed by major reasons, which should be properly justified. Non-justified delays will imply the dismissal of the given assignments as evaluation materials, resulting in an assignment score of 0.0.

Evaluation will be continuous. A Pass grade will only the final grade will be numerically calculated according to the following scheme.

<table>
<thead>
<tr>
<th>ASPECT</th>
<th>CRITERIA</th>
<th>INSTRUMENT</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance and participation</td>
<td>Active participation during class and programmed activities</td>
<td>Observation and notes from the professor</td>
<td>10%</td>
</tr>
<tr>
<td>Base Concepts and specific Software Skills</td>
<td>Knowledge and command of the technical and conceptual aspects of the course.</td>
<td>Reflected in the submitted assignments</td>
<td>35%</td>
</tr>
<tr>
<td>Assignments</td>
<td>Submission of the given assignments</td>
<td>Intermediate and final submission of assignments</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Correct graphical and conceptual arrangement of the submitted assignments.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The instructor could occasionally demand the completion of a short exercise in the classroom to test the individual level of the students.

In order to give the students an insight on their level of fulfillment of the course requirements, a provisional score may be assigned individually by the instructor upon reaching the end of the third unit. This score will be used only for orientation purposes, and will not necessarily be related with the final semester score.

The first examination session will only be considered satisfactorily complete with a grade of 5.0 or more.

Attendance: According to the current attendance policy of IE University, class attendance is mandatory in the first examination session. All rules about attendance to classes will be established by the general regulations of IE University, which currently requires a minimum class attendance of 70% during the first examination session. If this condition is not fulfilled, the student's coursework will not be graded, resulting in an overall grade of 0.0. Also according to the current IE University policy, students that do not fulfill these attendance requisites will lose their right to the second examination session, and thus will be directed to the third examination session.

Partial attendance to a session or repeated late arrivals to class will be considered as sessions missed by the student regarding global class attendance figures.
5.2.2. Second and fourth examination sessions.

Those students whose studio work has not been positively evaluated will be required to pass an extraordinary examination session. All rules about attendance to classes will be established by the general regulations of IE University.

The content, format and evaluation criteria of these additional examinations will be adjusted according to the specific studio performance and coursework situation of each individual.

Because of this, students falling under these circumstances will be responsible for contacting the instructor at least three weeks prior to the expected examination submission date in order to be notified about the specific requirements for their satisfactory fulfillment of the course.

No claims will be accepted if the student fails to contact the instructor within the timeframe set above, as it will then be understood that he/she declines the opportunity to pass the course within the current examination session.

After the second and fourth examination sessions, and according to the current IE University policy, the student will be graded according to both his/her performance in the exam and his/her performance during the course.

The second and fourth examination sessions will only be considered satisfactorily complete with a grade of 5.0 or more. According to the general regulations of IE University, students cannot earn a grade higher than 8.0 in the second and fourth examination sessions.

5.2.3. Third examination session.

Those students that do not receive a positive evaluation in the second examination session will be required to retake the full studio semester during the following academic year.

Those students will produce two new, complete design assignments, which will constitute their primary evaluation material.

Students falling under this category may be subject to a minimum class attendance policy, which will be set by the general regulations of IE University.

Nevertheless, they will be fully responsible for contacting the instructor in order to be notified well in advance of the expected assignment submission dates and further details leading necessary for their satisfactory fulfillment of the course.

The submission on time of the assignments is mandatory. It can only be postponed by major reasons, which should be properly justified. Non-justified delays will imply the dismissal of the given assignments as evaluation materials, resulting in an assignment score of 0.0.

In the third examination session, the numerical calculation of the student grades will be done according to the following scheme:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Criteria</th>
<th>Instrument</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Concepts and specific Software Skills</td>
<td>-Knowledge and command of the technical and conceptual aspects of the course.</td>
<td>Reflected in the submitted assignments</td>
<td>40%</td>
</tr>
<tr>
<td>Assignments</td>
<td>-Submission of the given assignments -Correct graphical and conceptual arrangement of the submitted assignments.</td>
<td>Intermediate and final submission of assignments</td>
<td>60%</td>
</tr>
</tbody>
</table>

6- USE OF ELECTRONIC RESOURCES

We highly recommend the use of a laptop in class, Wi-Fi connection needed. In any case, the use of Wi-Fi for activities not related to this class will hinder the student’s grade on participation.