Course guides
310003 - 310003 - Graphic Expression I

Last modified: 02/04/2020

Unit in charge: Barcelona School of Building Construction
Teaching unit: 752 - RA - Departamento de Representación Arquitectónica.

Degree: BACHELOR'S DEGREE IN BUILDING CONSTRUCTION SCIENCE AND TECHNOLOGY (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2015). (Compulsory subject).

Academic year: 2020 **ECTS Credits:** 9.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: PEDRO MON TAILLANT

Others: Primer quadrimestre:
RAMON BADIA SERRAHIMA - 1M, 2M
DIDAC GORDILLO BEL - 1M
PEDRO MON TAILLANT - 3M, 4T

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. FE-1 Ability to understand and make the graphical documentation of a project, to do data gathering, surveying of plans and geometric control of construction units.
2. FE-2 Knowledge of the infographic and cartographic procedures and methods in the construction field.

TEACHING METHODOLOGY

The faculty will teach theoretical classes to expand on the theoretical topics (one or two sessions) and then there will be done a practical activity managed by the professor about the theoretical topic presented.
The practice will be done individually . The professor will give some rules and standards for solving the practice and will help the students so that they can achieve the objectives of the exercise.
The independent learning of the study will consist on the fulfilment of work related with the topics of the subject but with total autonomy, only with help of personal tutorials or small students groups.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students should be able to:

· Graphically analyse through a representation system an architectural element of the space, in a freehand paper form.
· Explain the meaning of the following concepts: sketch, proportion, interpretation, line, dimensioning, linear system, fold line system, and dimensioning system.
· Relate the different projection planes, the use of the different plane changes and auxiliary views.
· Define the suitable point of view for a perspective, as well as the vanishing points.
· Identify the representation systems.
· Use the suitable methods in order to carry out freehand drawing and the representation of a scaled plan.

STUDY LOAD

Type	Hours	Percentage
Self study	135,0	60.00
Hours large group	45,0	20.00
Hours medium group	22,5	10.00
Hours small group	22,5	10.00

Total learning time: 225 h

CONTENTS

Content 1: Introduction to building drawing

Description:
1. Representation systems:
Difference between oblique, cylindrical and orthogonal projections.
Types of representation systems:
· Dihedral system (cylindrical orthogonal projection)
· Dimension line system (contour lines concept)
· Axonometric system (isometric projection, Din-5, cavalier projection and cabinet projection)
· Conic projection (vanishing point concept, point of view)
2. Space representation
Graphic representation functions:
· Idea concept. Paper reflections.
· Idea communication.
· Objective description of the object.
· Analytic drawing. Geometric construction lecture.

Specific objectives:
To know the development of the spacial view that allows the idea of figures and volumes in a three-dimensional space.
To know the geometric methods that allow the figure's and volume's representations in a three-dimensional space with different representation systems.

Related activities:
Done the first week.
Activities: 1,2 and 9.

Full-or-part-time: 15h 30m
Theory classes: 2h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 2: Object representation.

Description:
The dihedral and axonometric projections, two complementary systems.
· Go from one system to the other.
· Geometric operations: calculate areas and angles.
Drawing
· Introduction to freehand drawing.
· Fitting.
· Proportion.

Specific objectives:
To know the analysis methods and figures and volume's descriptions.
To know the application of the architecture representation systems.
The proportionality. Floor, elevation and cross plans with dihedral system.

Related activities:
Done the second week.
Activities 3, 4 and 9.

Full-or-part-time: 16h 30m
Theory classes: 3h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 3: Simple volumes in dihedral and axonometric projections

Description:
SPACIAL INTERPRETATION.
· Floor plan.
· Elevation plan. Detail drawing.
· Drawing agreements, scale concepts.
· Graphic scales.
· Representation depending on the detail level, according to the blueprint scale.
· The sketch as a knowledge tool.

Specific objectives:
To know how to:
· Use the axonometric projections.
· Use the dimension line system and its applications.

Related activities:
Done the third week.
Activities 5, 6 and 9.

Full-or-part-time: 16h 30m
Theory classes: 3h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 4: Roof drawing.

Description:
DIMENSION LINE SYSTEM:
· Slope and contour line concepts.
· Plane intersection and area development.

Specific objectives:
To know the analysis methods and the figures and volumes description.
To know how to represent the representation systems in architecture.

Related activities:
Done the fourth and fifth week.
Activities 7, 8 and 9.

Full-or-part-time: 15h 30m
Theory classes: 2h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 5: Figures Analysis

Description:
REGULAR POLYHEDRON

1 PYRAMID AND PRISMS AS A FORMAL BASE OF INDUSTRIAL AND ARCHITECTURE DESIGNS:
· Magnitudes and systems (regular and irregulars)
· Developments
· Geodesic

2 CYLINDER AS A FORMAL BASE OF INDUSTRIAL AND ARCHITECTURE DESIGNS:
· Surface of revolution (revolution axis)
· Contour definition in dihedral projection system: tangents.
· Plane sections as a conic curves definition: circumference, ellipse, parabola and hyperbole (notable points)

3 SPHERE REPRESENTATION:
· Contour definition in dihedral projection system: tangents.
· Plane sections as a conic curves definition: circumference, ellipse, parabola and hyperbole (notable points)
· Geodesic

Specific objectives:
To know the analysis methods and the figures and volumes description.
To know how to represent the representation systems in architecture.

Related activities:
Done during the forth and fifth week.
Activities 10, 11 and 12.

Full-or-part-time: 23h 15m
Theory classes: 3h
Practical classes: 6h
Guided activities: 2h 15m
Self study : 12h

Content 6: Interpretation and representation of construction elements.

Description:
FORMAL AND CONSTRUCTIVE INTERPRETATION
· Graphic blueprint drawing method
· Alternative resources.
· Elevations, roof and section plans. Scale transformation.
· Dimension line application in sketches.

SCALE CONCEPT:
· Standard scales of object representation: 1/1, 1/2, 1/5, 1/10, 1/20...

Specific objectives:
To know the analysis methods and the figures and volumes description.
To know how to represent the representation systems in architecture.
To know the correct representation of dihedral system and architectural drawings.

Related activities:
Done during the seventh and eighth week
Activities 13 and 14.

Full-or-part-time: 15h 30m
Theory classes: 2h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 7: Architectural element representation on indoor spaces.

Description:
INDOOR SPACE SKETCH AND DRAWING:
· Blueprint drawing methodology: triangulation.
· Alternative resources.
· Vertical sections.
· Stairs drawing.

Specific objectives:
To know the analysis methods and the figures and volumes description.
To know how to represent the representation systems in architecture.
To know the correct representation of dihedral system and architectural drawings.

Related activities:
Done during the ninth week.
Activity 15.

Full-or-part-time: 15h 30m
Theory classes: 2h
Practical classes: 4h
Guided activities: 1h 30m
Self study : 8h

Content 8: Shades representation and conical perspective.

Description:
SHADES
· Dihedral and axonometric system, geometric construction.
· Use of the dihedran and axonometric system as an expression resource.
THE CONICAL SYSTEM
· Introduction.
· Geometric construction.
· The sketch.

Specific objectives:
To be able to do the conical perspectives of the architectural elements and other perspectives.

Related activities:
Done during the tenth week.
Activities 16,17 and 18.

Full-or-part-time: 23h 15m
Theory classes: 3h
Practical classes: 6h
Guided activities: 2h 15m
Self study : 12h

Content 9: Stair representation and other constructive elements.

Description:
STAIR REPRESENTATION
· Dihedral: proportion of the steps by Tales Theorem.
· Physic description: stairs size and elevation of steps, landing representation.
· Blueprint representation method: triangulation.

OTHER CONSTRUCTIVE ELEMENTS
· Constructive details and different ways of representation.

Specific objectives:
To know how to draw stairs.
To know how to represent different constructive elements.

Related activities:
Activity 21.

Full-or-part-time: 7h 45m
Theory classes: 1h
Practical classes: 2h
Guided activities: 0h 45m
Self study : 4h

Content 10: Field integrated solutions.

Description:
All the steps in order to execute a medium building will be described, from the exhaustive data gathering on a freehand sketch, scale up of the drawing, the confection of a conical perspective until the representation of its shades.
All the resources of knowledge of each step will be explained and applied.

Specific objectives:
To know all the theoretical content of the course and its application.

Related activities:
Done during the last three weeks.
Activities 21-26.

Full-or-part-time: 38h 45m
Theory classes: 5h
Practical classes: 10h
Guided activities: 3h 45m
Self study : 20h

ACTIVITIES

A1 SIMPLE VOLUME STUDY

Description:
Exercises done in the classroom, individually, with a 2 hour duration. The exercises will be about the contents of the theory: volumetric elements with axonometric system for the resolution of different projections.
There will also be developed brainstorming exercises analyzing the object.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Technical drawing support material, like: set-square, rule, engineer's scale, compass...
Paper DIN A4 and DIN A3.
Available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
It will take two days to complete the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A2 SPACE REPRESENTATION (CONTENT 1)

Description:
Exercises done in the classroom, individually, with a 2 hour duration. The exercises will be about the contents of the theory: volumetric elements with axonometric system for the resolution of different projections.
There will also be developed brainstorming exercises analyzing the object.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Technical drawing support material, like: set-square, rule, engineer's scale, compass...
Paper DIN A4 and DIN A3.
Available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
It will take two days to complete the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A3 USEFUL RELATIONSHIP BETWEEN TWO REPRESENTATION SYSTEMS (DIHEDRAL AND AXONOMETRIC SYSTEMS CONTENT 2)

Description:
Individual working on the classroom of: freehand drawings and simple elements.
Axonometric representation passed to dihedral representation, and vice versa.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal and axonometric systems.
· Have space vision.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Freehand drawing method available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A4 HOW TO MAKE FREEHAND DRAWINGS OF CONSTRUCTIVE ELEMENTS (CONTENT 2)

Description:
Individual working on the classroom of different freehand drawings and simple elements in relation to the construction (bricks, for example) represented with dihedral and axonometric systems.
Exercises corrected by the professors.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal and axonometric systems.
· Have space vision.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Freehand drawing method available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A5 APPLICATION OF THE FREEHAND DRAWING FUNDAMENTALS (CONTENT 3)

Description:
Individual working on the classroom: drawing of a natural object on dihedral and ortogonal system (freehand drawing). Some of the objects will be studied in axonometric (with the different possibilities that the system provides).
Exercises corrected by the professors.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal and axonometric systems.
· Have space vision.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Freehand drawing method available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A6 USEFULNESS OF AXONOMETRIC SYSTEM (CONTENT 3)

Description:
Individual working on the classroom: resolution of volumes in axonometric system.
Later there will be given similar exercises to the students so that they can solve them at home.

Specific objectives:
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Material:
Technical drawing support material, like: set-square, rule, engineer's scale, compass...
Paper DIN A4 and DIN A3.
Available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A7 DIMENSION LINE SYSTEM (CONTENT 4)

Description:
Individual working on the classroom: exercises for the application of the dimension line system (roofs and lots).
Later there will be given similar exercises to the students so that they can solve them at home.

Specific objectives:
To know the different regular polyhedron and its representation on space.
To know the distance, angles and space position concepts.

Material:
Technical drawing support material, like: set-square, rule, engineer's scale, compass...
Paper DIN A4 and DIN A3.
Available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Laboratory classes: 0h 45m
Self study: 4h

A8 HOW TO DRAW ROOFS WITH DIMENSION LINE SYSTEM

Description:
Individual working on the classroom: exercises for the application of the dimension line system (roofs and lots).
Later there will be given similar exercises to the students so that they can solve them at home.

Specific objectives:
To know the different regular polyhedron and its representation on space.
To know the distance, angles and space position concepts.

Material:
Technical drawing support material, like: set-square, rule, engineer's scale, compass...
Paper DIN A4 and DIN A3.
Available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A9 PARTIAL TEST 1 (CONTENTS 1,2,3,4)

Description:
Individual test divided in two parts: basic technical concepts of the course (90 min duration) and freehand drawing of the contents of the course (3 hours duration).

Specific objectives:
Spacial view
Basic figure drawing
Basic sketch concepts

Material:
Wordings of the two parts, technical drawing materials (set-square, rule, engineer's scale, compass etc.)
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...

Delivery:
Test resolution. It is worth a 20% of the final course mark.

Full-or-part-time: 13h
Practical classes: 6h
Self study: 7h

A10 REGULAR POLYHEDRON, PYRAMID AND PRISM (CONTENT 5)

Description:
Exercise to find the areas of symmetric planes. Dimension lines of the regular polyhedron (pyramid and prism)

Specific objectives:
To know the regular polyhedron and its space representation
To know the distance, angles and space position concepts.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
DINA3 and DINA4 paper.
Notes: Lesson 4: Figures. Regular Polyhedrons.
Solved exercises: Symmetric section of a polyhedron.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A11 REGULAR POLYHEDRONS, REVOLUTION FIGURES AND SPHERES

Description:
Exercise to find the areas of symmetric planes. Dimension lines of the regular polyhedron (pyramid and prism)

Specific objectives:
To know the regular polyhedron and its space representation
To know the distance, angles and space position concepts.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
DINA3 and DINA4 paper.
Notes: Lesson 4: Figures. Regular Polyhedrons.
Solved exercises: Symmetric section of a polyhedron.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A12 REGULAR POLYHEDRONS, THE CUBE AND THE TETRAHEDRON (CONTENT 5)

Description:
Exercise to find the areas of symmetric planes. Dimension lines of the regular polyhedron (cubes and tetrahedrons)

Specific objectives:
To know the regular polyhedron and its space representation
To know the distance, angles and space position concepts.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
DINA3 and DINA4 paper.
Notes: Lesson 4: Figures. Regular Polyhedrons.
Solved exercises: Symmetric section of a polyhedron.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A13 FREEHAND DRAWING IN OUTDOORS (CONTENT 6)

Description:
Freehand drawing of outside elements.
Analysis methods and description of figures and volumes.
Application of the representation systems.
Teach the students how to apply the studied concepts of proportionality, interpretation, dimension lines and the correct utilization of graphite hardness. Furthermore, the application of the dihedral system projections.
The professors correct the exercises and, in the next class, a general reflection of the typical mistakes is given.

Specific objectives:
Stairs, roofs and slopes representation.
Plane section representation.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
DINA3 and DINA4 paper.
Notes: Lesson 4: Figures. Regular Polyhedrons.
Solved exercises: Symmetric section of a polyhedron.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises. The exercises will be returned to students corrected.
At the end of the practice students should be able to:
· Represent elements in space with the dihedral orthogonal system.
· Have space vision.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A14 SCALE CONCEPT (CONTENT 6)

Description:
Transcribe in paper (through scale concepts and blueprint resolution with the suitable graphic tools) sketch model of session 12, choosing the most suitable.
The work will have all the necessary projections to define the object. A graphic scale will be included.

Specific objectives:
To know how to transcribe a freehand drawing with a blueprint formal representation through the different graphic methods.
Verify the difficulties of transcribing from a sketch to a blueprint.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
Drawing method available in ATENEA Campus

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A15 AND 16 FREEHAND DRAWING IN INDOORS (CONTENT 7)

Description:
Freehand drawing of inside elements.
Analysis methods and description of figures and volumes.
Application of the representation systems.
Teach the students how to apply the studied concepts of proportionality, interpretation, dimension lines and the correct utilization of graphite hardness. Furthermore, the application of the dihedral system projections.
The professors correct the exercises and, in the next class, a general reflection of the typical mistakes is given.

Specific objectives:
Representation of indoor architectonic elements.
Plane section representation, triangulation and stairs.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 13h 30m
Practical classes: 4h
Guided activities: 1h 30m
Self study: 8h

A17 SHADES AND CONIC PERSPECTIVES (CONTENT 8)

Description:
Exercises of the point of view, plane and vanishing point.
Shade construction.
Restitutions.

Specific objectives:
Choose the best point of view for a good perspective
To know the mechanisms for the execution of the perspective
Necessary restitution.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.).
Drawing method available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A18 SHADES AND CONIC PERSPECTIVES (CONTENT 8)

Description:
Exercises of the point of view, plane and vanishing point.
Shade construction.

Specific objectives:
Choose the best point of view for a good perspective.
To know the mechanisms for the execution of the perspective.
To know the mechanisms for the application of shades in axonometric and dihedral system.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.).
Drawing method available in ATENEA Campus.

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Laboratory classes: 0h 45m
Self study: 4h

A19 SHADES AND CONIC PERSPECTIVES (CONTENT 8)

Description:
Exercises of the point of view, plane and vanishing point.
Shade construction

Specific objectives:
Choose the best point of view for a good perspective
To know the mechanisms for the execution of the perspective
To know the mechanisms for the application of shades in axonometric and dihedral system.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
Drawing method available in ATENEA Campus

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A20 PARTIAL TEST (CONTENTS 5,6,7,8)

Description:
Individual test divided in two parts: basic technical concepts of the course (90 min duration) and freehand drawing of the contents of the course (3 hours duration).

Specific objectives:
Spacial view
Basic figure drawing
Basic sketch concepts

Material:
Wordings of the two parts, technical drawing materials (set-square, rule, engineer's scale, compass etc.)
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...

Delivery:
Test resolution. It is worth a 20% of the final course mark.

Full-or-part-time: 13h
Practical classes: 6h
Self study: 7h

A21 STAIRS DESIGN (CONTENT 9)

Description:
Stair design exercise keeping in mind:
Dihedral, step proportion by Tales theorem.
Physic description: steps height and thickness, landings.
Blueprint drawing method: triangulation and scale.
Application of the representation systems studied.
Teach the students how to apply the studied concepts of proportionality, interpretation, dimension lines and the correct utilization of graphite hardness. Furthermore, the application of the dihedral system projections.

Specific objectives:
Inside representation of the architectonic elements
Interpretation of plane sections, triangulation and scales.

Material:
Technical drawing materials (set-square, rule, engineer's scale, compass etc.)
Drawing method available in ATENEA Campus

Delivery:
Delivery of the completed exercises when the professor sets up.
Learning prove of the students made by the professor with all the results of the exercises.

Full-or-part-time: 6h 45m
Practical classes: 2h
Guided activities: 0h 45m
Self study: 4h

A 22,23,24,25,26 FIELD INTEGRATED SOLUTIONS (CONTENT 10)

Description:
Explanation of the steps to build a medium building, its conic perspective and its shades representation.
Explanation of the processes and resources to make a correct presentation.

Specific objectives:
This work is done in order to put on practice the knowledge of the course, considering which would be the next course lessons.

Material:
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...
Freehand drawing method available in ATENEA campus

Delivery:
During 5 weeks, corrections will be carried out in order to make a correct execution of the work.
It will be delivered the last week of the course, correctly bound, included on the course notebook.
It will be corrected by the professor.

Full-or-part-time: 33h 45m
Practical classes: 10h
Guided activities: 3h 45m
Self study: 20h

A27 PARTIAL TEST 3

Description:
Individual test divided in two parts: basic technical concepts of the course (90 min duration) and freehand drawing of the contents of the course (3 hours duration).

Specific objectives:
Application of the concepts of freehand drawing
Application of the representation systems: dihedral, axonometric, conic etc.

Material:
Wording of the two parts
Freehand drawing support material, like: wooden board, rubber, pencil with different hardness, sharpener...

Delivery:
Test resolution. It is worth a 20% of the final course mark.

Full-or-part-time: 10h 15m
Practical classes: 2h
Self study: 8h 15m

GRADING SYSTEM

The evaluation of the students will be continous.
The class practices and autonomous practices will be evaluated.
There will be done two evaluation sessions during the course.
All the work will be collected in a portfolio.
The final mark of the subject is obteined by these percentages:

Practices at class: 20%
Autonomous practices: 20%
1st Exam: 30%
2nd Exam: 30%
The final mark will be the addition of all the %.
The student at the end of the evaluation does not meet the objectives propustos, will test reassessment provided that their mark is not less than 3.5 and attendance and delivery of work has been done regularly.

EXAMINATION RULES.

It is compulsory to submit the 80% of all the practices.

BIBLIOGRAPHY

Basic:
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