UNICUSANO
ROME

Code: ICAR/17 **Credits: 9**
Matter: Technical Drawing
Main language of instruction: Italian
Other language of instruction: English

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OBJECTIVE OF THE COURSE

The Technical Drawing course aims to acquire scientific methods, tools and techniques useful for knowledge and representation of projects.
The aim of the course is to provide the necessary tools allowing to translate the ideas into graphic form, that is to represent three-dimensional elements in two dimensions, by using a graphical language encoded.
The course intends to examine the principles of the projective and descriptive geometry, as essential tool to control each application of the draw (traditional and digital draws). The projective and descriptive geometry is fundamental to understand different representation methods (i.e. Monge's method, axonometry, perspective). The course concerns also practical issues, as graphic scale and dimensioning systems, necessary to a correct graphic elaboration of a project.

COURSE STRUCTURE

The course is organized in two parts, including in total nine modules. The first part of the course is about the principles of projective and descriptive geometry (module 1). Starting from these principles, the course examines three different representation methods: the Monge's Method (module 2), the axonometry (module 3), the perspective (module 4).
The second part of the course addresses to the comprehension of technical and representational rules, basic notions about drawing in different fields, fundamental concepts about CAD (Computer Aided Design) (modules 6-7). Finally there are some exercises as application of the concepts and methods explained in the previous modules (modules 8-9).
The interactive teaching is carried out in the forum of the "virtual class" (collaborative area of the platform) and includes the Etivities in which the student applies the knowledge acquired in theory.

COMPETENCIES

The student who passes the Technical Drawing exam will acquire knowledge and competences about principles and tools for the graphic representation of a project. The student will be able to draw by different representation methods. He/She will also be able to apply the acquired competences in order to identify and concretely solve representational issues. These skills will be improved by practical exercises.

PROGRAMME OF THE COURSE

Elements of Euclidea and projective geometry

Fundamental elements: point, line, plane. Projection space: improper point, improper line, improper plane. Fundamental forms of I, II, III species. Principle of duality. Basic operations: projection and section (cylindrical and conical projections, projection centers). Projectivity and prospectiveness. Homography. Homology: definition, centers, axes. Properties of homology. Special cases of homology.

Monge's method

General concepts. Reference in space and plane. Representation of fundamental elements (point, line, plane). Conditions of belonging, parallelism, perpendicularity. Overturning of the projection and generic planes. Representation of a regular polygon.

Axonometry

General concepts. Orthogonal axonometry. Oblique axonometry. Cavalier axonometry. Representation of fundamental elements (point, line, plane). Condition of belonging, parallelism, perpendicularity. Exploded axonometric and cross section axonometric.

Perspective

General concepts. Perspective with vertical picture plane: reference in space and plane, representation of fundamental elements (point, line, plane), different methods. Perspective with inclined picture plane: reference in space and plane, representation of fundamental elements (point, line, plane), different methods.

Curves and surfaces

Definitions and genesis. Ellipse. Parabola. Hyperbola.

Definition of graphic models
Proportion and modularity. Standards and conventions of technical drawing. Format and sheet squaring. Architectural drawing. Graphic scale. Dimensioning systems. Graphic representation of a scale. Land survey design - general concepts. Urban planning - general concepts. Computer aided design - general concepts.

EVALUATION SYSTEM AND CRITERIA

The exam consists of a written test and E-tivities carried out during the course in virtual classes. The written test includes theoretical and practical exercises (about 8-9 exercises).
The students have also to elaborate seven drawings (application of the different topics covered during the course) to submit in order to take the exam. These elaborations are a necessary condition to take the exam.
The carrying out of E-tivities is recommended to make the seven drawings (part of the exam) with greater mastery.
The final mark of the exam will be determined by the evaluation of the seven drawings (which will contribute for 1/3 of the mark) and the written test (which will contribute for 2/3 of the mark).

BIBLIOGRAPHY AND RESOURCES

Materials to consult:
The educational materials (slides and video lessons) are available on the unicusano platform.

Recommended bibliography:

- Dell'Aquila M. (2002), *Il luogo della geometria*. Arte tipografica, Napoli.
- Docci M., Maestri D., Gaiani M. (2017), *Scienza del disegno*. Città Studi Edizioni.
- Docci M., D. Maestri (2009), *Manuale di rilevamento architettonico e urbano*. Laterza.
- Docci M., Migliari R. (1992), *Scienza della rappresentazione: fondamenti e applicazioni della geometria descrittiva*. La Nuova Italia Scientifica, Roma.
- Sgrosso A. (1996), *La rappresentazione geometrica dell'architettura. Applicazioni di geometria descrittiva*. UTET Università.