COURSE DESCRIPTION
APPLICATIONS OF DESCRIPTIVE GEOMETRY

SSD: DISEGNO (ICAR/17)

DEGREE PROGRAMME: ARCHITETTURA (N14)
ACADEMIC YEAR 2022/2023

COURSE DESCRIPTION

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: NOT APPLICABLE
MODULE: NOT APPLICABLE
CHANNEL: 02 Cognome A - Z
YEAR OF THE DEGREE PROGRAMME: II
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER II
CFU: 9

REQUIRED PRELIMINARY COURSES

Architectural drawing

PREREQUISITES

Students have to know the basic principles of drawing and the fundamental graphic conventions.

LEARNING GOALS

Descriptive Geometry is based on a theoretical and practical apparatus used for representation, interpretation of 3D configurationsand for rules study on which form construction is based.
The aim of the Descriptive Geometry Applications Course is the study of scientific methods aimed at representation, interpretation of the existing and the definition of the architectural project.
At the end of the course the student must know:
1. The fundamentals of Projective Geometry;
2. The representation methods of Descriptive Geometry: the method of orthogonal projections, the method of axonometric projection, the method of perspective projection and the shadows theory;

3. Geometric classification of lines and surfaces, their properties and the methods used for lines and surfaces generation. At the end of the course, students will be able to recognize the forms in their geometric features and to use the representation methods in order to describe different configurations.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

Student must demonstrate that he is able to understand the stereometric nature of space, to be able to use the methods of representation with a critical spirit, with scientific awareness and with graphic sensitivity, in order to highlight the fundamental characteristics of the spatial configurations analyzed.

He will have to know the principles on which the geometric genesis of surfaces is based and be able to apply them to control the creative process

Applying knowledge and understanding

Knowledge acquired by student in the field of projective methods and geometric configuration of the architecture allows to control and to prefigure the spaces designed, and to proportion and obtain an effective and rigorous communication of the project. The same knowledge will also allow student to critically interpret existing architectures, for the purposes of surveying and representing them.

Further expected learning outcomes are:

Autonomy of judgment: Student must be able to independently choose the most appropriate representation methods for the spatial configurations analyzed or designed, he must have acquired skills in order to model shapes in space and he is be able to manage configurations as well complex.

Communication skills: Student is stimulated to elaborate with clarity and scientific rigor the communicative artifacts need to transmit the metric and geometric qualities of the spatial configurations analyzed, both in the technical field, respecting the graphic conventions, and through effective and / or plausible representations that are also comprehensible to non-experts.

Learning skills: digital modeling used for the construction of shapes in space offers student the basis for deepening areas strongly linked to applied geometry, to experiment with the use of generative algorithmic tools and to define dynamic and / or interactive representation systems.

COURSE CONTENT/SYLLABUS

1. ELEMENTS OF PROJECTIVE GEOMETRY

The fundamental geometric entities: point, line, plane. The fundamental operations: projection and section. The entities of the projective space. Projective invariants. Perspective and projectivity between lines and planes. Homology

2. DOUBLE ORTHOGONAL PROJECTIONS

The reference in 3D space and 2D plane. Representation of the fundamental geometric entities: point, line, plane. Conditions of belonging, parallelism and orthogonality. Elementary graphical problems solving. Intersections, Overturning of a projecting floor and a generic plan. measurement

problems.
3. AXONOMETRIC PROJECTIONS
Isometric orthogonal axonometry. Oblique cavalier axonometry. Military oblique axonometry
4. CENTRAL PROJECTIONS
Vertical picture plane perspective. Inclined inclined picture plane perspective. Horizontal picture plane perspective
5. GEOMETRIC GENESIS OF SURFACES
Rotating surfaces. Translation surfaces. Rototranslation surfaces. Ruled surfaces
6. ARCHES AND VAULTS
Nomenclature. Simple vaults. Composed vaults
7. 2D LINES AND 3D LINES
8. THEORY OF SHADOWS

READINGS/BIBLIOGRAPHY

Capone M., *La genesi dinamica della forma. Applicazioni di Geometria descrittiva nell'era informatica*, Fridericiana, Napoli 2010

Capone M., *Geometria per l'Architettura*, Giannini Editore, Napoli 2012

Capone M., *Corso di Geometria Descrittiva*, Corsi della Facoltà di Architettura Federica web learning, http://www.federica.unina.it/courseware/

Dell'Aquila M., *Il luogo della geometria,* Arte Tipografica, Napoli 1999

Migliari R. *Geometria Descrittiva*, Città studi edizioni, Novara 2009

Sgrosso A., *La rappresentazione geometrica dell'architettura,* Utet, Torino 1996.

Capone M., *Prospettiva e misura*, Arte Tipografica, Napoli 2005

TEACHING METHODS OF THE COURSE (OR MODULE)

The teacher will use:
a) theoretical lessons for about 60% of the total hours,
b) 30% to illustrate and carry out some of the applications of fundamental descriptive geometry
c) 10% to deepen some specific topics in relation to the chosen case studies.
Three-dimensional modeling software will be used and online teaching materials will be provided relating to specific topics chosen for the exercises.

EXAMINATION/EVALUATION CRITERIA

a) Exam type

- ☐ Written
- ☑ Oral
- ☑ Project discussion
- ☐ Other

In case of a written exam, questions refer to

- ☐ Multiple choice answers

- ☐ Open answers
- ☐ Numerical exercises

b) Evaluation pattern