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: 01 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

None

LEARNING GOALS

Descriptive Geometry is based on a theoretical and practical apparatus used for the representation, the interpretation of three-dimensional configurations and the study of those rules on which the construction of shape is based. The applications of the Descriptive Geometry Methods are fundamental for the analysis of the existing buildings and for the development and control of the architectural project Objective of the Applications of Descriptive Geometry Course is the study of scientific methods aimed at the representation, interpretation of the existing and definition of the architectural project.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

Upon completion of the course, the student should know in particular: 1. The fundamentals of Projective Geometry; 2. The methods of representation of Descriptive Geometry, namely, the method of orthogonal projections, the method of axonometric projection, the method of perspective projection, and shadow theory. 3. The geometric classification of surfaces, notable properties and methods used for generation. Upon completion of the course the student will be able to recognize the forms of architecture in their geometric peculiarities and use the most appropriate methods of representation for the purpose of adequate description of the configurations analyzed.

The student will be expected to demonstrate an understanding of the stereometric nature of space, to be able to use methods of representation critically, with scientific awareness and with graphic sensitivity, so as to highlight the fundamental characters of the spatial configurations analyzed. He/she should know the principles underlying the geometric genesis of surfaces and be able to apply them to control the creative process

Applying knowledge and understanding

The student will be expected to demonstrate an understanding of the stereometric nature of space, to be able to use methods of representation critically, with scientific awareness and with graphic sensitivity, so as to highlight the fundamental characters of the spatial configurations analyzed. He/she should know the principles underlying the geometric genesis of surfaces and be able to apply them to control the creative process

COURSE CONTENT/SYLLABUS

lesson n.1: Elements of descriptive geometry
lesson n.2: Construction and applications of homology. Exercise
lesson n.3: THE MONGE METHOD Representation of fundamental entities
lesson n.4: THE MONGE METHOD Representation of fundamental entities
lesson n.5: Graphical problems, intersections, plane reversal
lesson n.6: Conic sections
lesson n .7: Conic sections in Monge's method
lesson n.8: Conic sections in Monge's method
lesson n.9: AXONOMETRY Isometric axonometry.
lesson n.10: The cavalier axonometry sections as homological transform of Mongian projections.
lesson n.11: Curves and surfaces: Flat and oblique lines, flat and oblique curves: geometric genesis, surfaces of rotation and quadric

surfaces: configurative genesis, Ruled surfaces: undevelopable and undevelopable ruled surfaces;
lesson n.12: Geometry of complex surfaces in contemporary architecture: the example of the masters. Presentation of the theme of the year.
lesson n.13: Basics of 3D solid modeling with Rhinoceros software and tutorial: geometric principles
lesson n.14: Basics of 3D solid modeling with Rhinoceros software and tutorial: geometric principles
lesson n.15: Basics of 3D solid modeling with Rhinoceros software and exercise: geometric principles
lesson n.16: Archs and vaults: cylindrical vaults, spherical vaults, annular vaults: geometric genesis
lesson n.17: First collegiate verification in the classroom of the progress of the year's theme: presentation of the drawings by the students
lesson n.18: Perspective with a vertical picture lesson n.19: Perspective with an inclined picture
lesson n.20: Perspective with the overturning method and perspective heights
lesson n.21: Second collegial verification in the classroom of the progress of the year's theme: presentation of the papers by the students

lesson n.22: The theory of shadows, shadows in Monge's method, Shadows of flat figures and
lesson n.23: Shadows of compositions of solid figures. Self-made shadows. Shadows on the elevations and floor plans. Geometrical principles for the apparent motion of the Sun.
lesson n.24: Last collegiate verification in the classroom of the progress of the year's theme and conclusion of the course.

READINGS/BIBLIOGRAPHY

F.F.Buonfantino, A. Pagliano (2019), Disegnare un mondo migliore. Il campus universitario di Oscar Niemeyer a Costantine, Franco Angeli. A. Gesuele, A Paliano, V. Verza (2018), La geometria animata. Lezioni multimediali di Geometria descrittiva, Cafoscarina, Venezia R. Migliari (2009), Geometria descrittiva, Città studi ed. A. Pagliano (2011), Oscar Niemeyer. La geometria della forma, Franco Angeli. A. Sgrosso (1996), La rappresentazione geometrica dell'architettura, UTET, Torino.

TEACHING METHODS OF THE COURSE (OR MODULE)

a) frontal lessons for about 70% of the total hours, b) exercises to practically deepen theoretical aspects for about 20% of the hours, c) classroom checks for the remaining 10% of the hours

EXAMINATION/EVALUATION CRITERIA

a) Exam type

- [ ] Written
- [x] Oral
- [x] Project discussion
- [ ] Other

In case of a written exam, questions refer to

- [ ] Multiple choice answers
- [ ] Open answers
- [ ] Numerical exercises

b) Evaluation pattern