

FACULTY OF **ENGINEERING**

DEGREE COURSE: **CIVIL AND ENVIRONMENTAL
ENGINEERING BS**

SUBJECT: DRAWING

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OBJECTIVES

The course aims to help students develop the ability to control, knowledge, scientific description of the space and then forms that compose it. Teach the rules and applications of descriptive geometry associated with systems of representation traditional and advanced (computerized). This will provide valuable support to the future engineer when working on a project, to know, manage and/or modify the geometric model. Learning is through a series of lectures and practical exercises.

Knowledge:

1. The fundamental principles and theories related to the techniques of representation of space framed in their historical context;
2. UNI applied to the design;
3. theory for life drawing of the architecture and the environment;
4. correctly represent the architecture and the territory;
5. fundamentals of the science of projective representation;
6. the theory and applications of the methods of representation and, specifically: the dual orthogonal projection, the isometric, the central projection or perspective projection listed, the theory of shadows and chiaroscuro;
7. the theory of integrated detection for historic buildings;
8. theoretical knowledge of digital design and purposes of the different software

Capability:

1. measure the architectural space and represent it properly in three dimensions;
 2. identify the techniques of graphic representation in relation to spatial principles and the constituent elements of the anthropic space;
 3. perform the architectural drawings by adopting the relevant national and international conventions;
 4. perform freehand sketches, also chiaroscuro, both as a support of the design process as a direct reading of the historical architecture;
 5. be able to represent the architectural space, employing the methods and procedures of science of the representation, using analog, digital technical design tools and in freehand
 6. analyze, graphically, the values of the architecture;
 7. draw real shapes and proportions from observation.
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CONTENT

The course consists of three parts:

1. fundamentals of geometric representation,
2. theory and practice of architectural representation,
3. the theory and practice of doing an architectural survey.

Part One:

Plane geometrical figures

The foundations of projective geometry: basic geometric entities, and projection operations section, improper elements. The methods of projective geometry: central projection (perspective) projections, parallel (orthogonal, isometric, listed). The orthogonal: reference elements, the representation of entities fundamental conditions of membership, conditions of parallelism, perpendicularity conditions, applications, problems of measurement, the representation with the use of a third projection plane, projecting sections with plans and plans with generic, actual size of the sections with plans projecting. Some applications carried out in virtual space 3D. Axonometric projections: reference elements; axonometric orthographic, isometric, dimetric, trimetric; fundamental triangle; axonometric oblique theorem Polhke; axonometric oblique cavalier cavalier military and themselves; the representation of basic geometric entities; conditions of membership; conditions of parallelism. Projections listed: reference elements; fundamental representation of entities; conditions of membership; conditions of parallelism; orthogonality conditions; applications; the representation of the terrain; intersections. The central projection (perspective): reference elements, the fundamental representation of entities (point, line, plane) conditions of membership, terms of parallelism, squareness conditions, applications, measurement problems.

Part Two:

Regulatory aspects for the technical design of building. Bodies of unification, manuals, professional practice. UNI; formats and squaring of the sheets; available to the design and inscriptions on the sheets of drawings; types, thicknesses and applications of the lines; representation scales; lines of measurement, reference indicators terminals, booster lines, units; dimensioning systems: in series, in parallel, progressive, in Cartesian coordinates, polar coordinates; backgrounds for the representation of materials in sections; symbolic representations. Representations for building: floor plans, plans, sections, elevations, elevations-section, axonometric, perspective. The construction details. Representation scales and fields of application. The design for the architectural design; Articulation of the design and related drawings according to normative references: preliminary design, final design, working drawing. The organization of the drawings

Part Three:

Content detection. Purpose of Detection. Stages of detection. The eidotipo. The chart pattern restorative. Methods of detection (direct, indirect, photogrammetry, integrated). Tools for detection. The design of the detection. Planimetric detection, sections, prospectuses, architectural details. Digital technologies for detection.

Assessment

Before the Exam

The student MUST have completed the exercises given out during the course to a high enough standard to be considered for entry into the exam.

- Delivery via web server (Service "My Documents") of color scans at least 80% of the documents requested, with 7 days in advance of the date of the examination (minimum resolution 300 dpi, file format jpg, pdf or tif). The delivery can be made only in this way: you can not use other methods (by mail or delivery systems jumbo mail address) unless it is absolutely necessary and only after agreement - via mail- with the teacher. The delivery (on time, delivered material and quality of the same) will be an integral part of and contribute to the final score;
- for the test run graphics, the student must bring the tools of traditional design with some sheets of A3 paper weight at least 180 g / sq m (test duration 45 min.);
- deliver, discussion and evaluation of the original drawings during the course by the student, collected in a folder or bound in an album;
- delivered on CD or DVD of color scans of all the documents required (minimum resolution 300 dpi, file format jpg, tif or pdf) and all the 2D and 3D files in addition to the exercises presented in accordance with the rules set out during the course .

The exam

The exam, is organized into two phases: practical drawing (written test) and an interview (oral). The student must pass the first phase in order to proceed to the interview phase.

The interview will focus on the following topics:

- the course program;
- discussion of the drawings required to the student during exercises.

Recommended Textbooks

- BATOLI M.T., FOSSI E., MELE G., *"Musso e non quadro: la strana figura di Palazzo Vecchio dal suo rilievo"* autore del capitolo *Architettura gotica e disegno urbano : la piazza e i fronti verso il centro antico*. Firenze, Edifir 2007
 - DOCCI M., MAESTRI D., *Manuale di rilevamento architettonico ed urbano*, Laterza, Roma-Bari 2009
 - MIGLIARI R., *Geometria descrittiva*, CittàStudi, Milano 2009
 - ROSSI M. (a cura di), *Descriptive Geometry and Digital Representation: Memory and Innovation*. Milano, New York:THE MCGRAW-HILL COMPANIES,
 - ROSSI M., DUVERNOY S., MELE G.,(a cura di), Milano. Maths in the city: a mathematical tour of Milan architecture. Milano, Maggioli Editore, 2012
 - ROSSI M., BISSON M., BONTEMPI D., BOVE M., BURATTI G., MELE G., DE PAOLIS R., FERRARA M., GALLONI L., JONES KB., MANCA M., PIERLUISI G., *Il disegno come ricerca. Strumenti grafici e modelli rappresentativi per il progetto*, Santarcangelo di Romagna, Maggioli S.p.A. Editore, 2013
 - ROSSI M. (a cura di), *Geometria, Spazio, Colore. Ricerche per la rappresentazione e il progetto*, Santarcangelo di Romagna, Maggioli S.p.A. Editore, 2013
 - U.N.I., *Norme per il disegno tecnico*
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