ARCHITECTURE

Courses offered during Winter semester (academic year 2026-27)

Drawing I (1st year, 6 ECTS)

Syllabus:
-To represent through a set of instruments of plastic expression the surrounding reality.
-Produce drawings as synthesis of the processes of seizure of space.
-Ensure the indispensable critical enlargement and rationale of the design produced and establish collective debate/criticism sessions.
-Encourage students to have the knowledge and competences acquired by the student be synthesized by exposing their
Experiences/drawings.

Teaching Methodologies (including assessment):
Continuous
Demonstration of the Coherence between the Teaching Methodologies and the Learning Outcomes: The design associated with the projectual practice will always contribute to an improvement of the capacities of representation and expression, as well as the quality of the project itself.

Bibliography:
[1] Arnheim, R (1980), " Arte e Percepção Visual", S. Paulo , Ed. Pioneira.
[2] Betti, C. E Sale T.(1986),"Drawing – a contemporary approach", ed. Fort worth.
[3] Edwards, B. (1984), " Aprender a dibujar" Madrid, ed. Hermann Blume.
[4] Godfrey, T. (1990), " Drawing today", USA, Phaidon Inc Ltd.
[5] Leymarie, J. et al. (1979), " Le dessin", Skyra,
[6] Massironi, Manfredo (1993), " Ver pelo desenho", Lisboa, Edições 70.

Project I (1st year, 12 ECTS)

Syllabus:
1 - Object and method in architectural conception: (1) architecture as the projection of spatial transformation at its various scales; (2) shelter as the humanization of space; (3) The Vitruvian dimensions of architecture: function, safety, and beauty; (4) Architectural design as a cyclical process of experimentation, comparison, assessment, and decision; (5) Architectural design as formal and conceptual research.
2 - Analog instruments of representation and their potential in architectural design: (1) freehand drawing; (2) geometric drawing of orthogonal projection (plan, section, elevation, axonometry, representation scales, and contour lines); (3) three-dimensional models.
3 - Elements of qualification of architectural space: (1) volume, plane, line; (2) light; (3) solid/void and concave/convex; (4) geometry; (5) scale and proportion; (6) rhythm.

Teaching Methodologies (including assessment):
The "practical laboratory classes," where work will be carried out and critiqued individually, will be complemented, at opportune moments, by collective debate/critique sessions for comparison and possible redirection. Simultaneously, "theoretical-practical classes" will be held where the information provided will seek to ensure the indispensable critical expansion and foundation of the produced design. Occasionally, study visits to exhibitions and/or works of reference architecture will be conducted, supporting the justified discussion of the architectural experience.
The course unit's assessment method is based on a continuous assessment model. Student participation in teaching contact hours is, as a rule, mandatory.

Bibliography:
[01] RASMUSSEN, Steen Eiler, “Viver a Arquitectura”, Caleidescópio, 2007
[02] MUNARI, Bruno, "Das coisas nascem coisas", Edições 70, Lisboa, 1981
[03] WERMER ; Vogel, Gunther Mueller, "Atlas de Arquitectura 1 e 2" , Alianza editorial, Madrid, 1996
[04] CARNEIRO, Alberto; TÁVORA, Fernando; MORENO, Joaquim ; [org.] ""Desenho Projecto de Desenho" Instituto de Arte Contemporânea, D.L. 2002
[05] " SIZA, Álvaro ; pref. Vittorio Gregotti. " Imaginar a evidência" - Lisboa : Edições 70, 2000
[06] ed. Desley Luscombe, Helen Thomas, Niall Hobhouse “Architecture through drawing” /. - London : Lund Humphries, 2019. - 240 p. : il. ; 31 cm
[07] BERGER, Jonh, “Modos de Ver”, Ed. 70, Lisboa, 1980
[08] CULLEN, Gorden, “Paisagem Urbana”, Edições 70, Lisboa, 1971
[09] CHING, Francis D.K., “Representação gráfica para desenho e projecto”, Editorial Gustavo Gili, Barcelona, 2001

Construction Systems in Architecture I (1st year, 3 ECTS)

Syllabus:
1. Materializing an idea – the design-build unity
2. Brief historical analysis
The evolution of architecture according to the materials and construction techniques evolution
3. Elementary notions
Structural elements and non-structural elements
Heavy construction, light construction, mixed solutions
Common arts in construction (stonework, carpentry, metalwork, etc.)
Common materials (stone, wood, metal, concrete, ceramic, etc.)
Behavior of a construction (solidity, waterproofing, thermal, lighting, efficiency, etc.)
4. The elements of a building
Foundation / contact with the ground, floors and vertical circulation; walls and openings; roof
5. Materials and construction systems
Raw material and transformed material: modules or construction parts
Conjugation of modules or construction parts
6. The definition of the constructive solution
Execution Project; constructive detail
Designed pieces and written pieces.

Teaching Methodologies (including assessment):
The theoretical classes are mainly based on the exposition of contents, analyzing several examples of works, with ample incentive for debate and discussion. The theoretical-practical and practical classes are also based on the exposition of contents, particularly analyzing construction details of built works, as well as the development of an individual work that consists on the constructive definition of a project by the student. Also, a group work will be carried out, consisting on an analysis of a

constructed work. The assessment includes a theoretical-practical assessment test, and the development of the individual and group works.

Bibliography:
[1] Allen, E. (1997). Como Funciona un Edificio. Gustavo Gili. Barcelona.
[2] Chudley, R. & Greeno, R. (2006). Manual de Construccion de Edificios. Gustavo Gili. Barcelona.
[3] Deplazes, A. (2010). Construir la Arquitectura. Del material em bruto al edifício. Um manual. Gustavo Gili. Barcelona.
[4] Gonçalves, M. & Margarido, F. (editoras) (2012). Ciência e Engenharia de Materiais de Construção. Instituto Superior Técnico.
[5] Ito, R. (2013). Álvaro Siza Design Process. Instituto Superior Técnico.
[6] Mcmorrough, J. (2006). Materials, Structures, and Standards. Rockport. Massachusetts.
[7] Mascarenhas, J. (vários anos). Sistemas de Construção (vários números e temas). Livros Horizonte.
[8] Reichel, A. & Schultz, K. (editores) (2014). Scale: Support I Materialise: Columns, Walls, Floors. Birkhauser. Basel.
[9] Van Lengen, J. (2010). Manual do Arquiteto Descalço. Dinalivro.

Geometry (1st year, 3 ECTS)

Syllabus:
1. Introduction to Geometry in Architecture
2. Geometric Constructions (geometric figures, tangents and transitions, arcs)
3. Plane Geometric Projections:
3.1 Notion of Projection and Projection Systems (conic and parallel projection - axonometries and perspectives)
3.2 Multiple Orthographic Projection System (European and American methods)
4. Technical Shadows
5. Representation of Architectural Spaces and Objects
6. Topographic Surfaces

Teaching Methodologies (including assessment):
The curricular follows an expository and descriptive methodology in theoretical classes, in which the main concepts are presented and developed. Practical-theoretical classes are based on a demonstrative methodology, through the presentation and explanation of representation methods and techniques, consolidated through the resolution of practical exercises.
The proposed methodologies seek the appropriate balance between knowledge acquisition and the ability to apply it in specific practical exercises.
The curricular unit is thus integrated into a pedagogical model that prioritises the ability to correctly execute representation techniques, as well as to select them appropriately, with the aim of supporting the development of the architectural design and analysis process.
Assessment: 2 theoretical-practical tests = 70%, 1 individual practical work = 20%, student performance = 10%

Bibliography:
[1] Abajo, F. Javier Rodriguez de, (1993), “Geometria Descriptiva - Tomo 2: Sistema de planos acotados”, San Sebastian, Editorial Donostiarra SA, 11ªedição
[2] Abajo, F., Javier Rodriguez de (1991), “Tratado de Perspectiva”, San Sebastián, Editorial Donostiarra SA
[3] Cunha, Luís Veiga da (1994) “Desenho Técnico”, Lisboa, Fundação Calouste Gulbenkian
[4] Morais, José M. Simões (1999), “Desenho Técnico Básico 3”, Porto, Porto Editora, 22ª edição

[5] Rotelli, Vanderlei, Santos, Sinval Avelino & França, Elena Furlan (2017), “Geometria Descritiva Aplicada à Arquitetura I”, Londrina : Editora e Distribuidora Educacional S.A.
[6] Peixoto, Elaine, Melara, José (2017), “Geometria Descritiva Aplicada à Arquitetura II”, Londrina: Editora e Distribuidora Educacional S.A.

Project III (2nd year, 12 ECTS)

Syllabus:
1. Program, “place,” methodology, and data collection;
2. Configurations and meanings: spatial research and modes of inhabiting;
3. The Habitat;
4. Design, Language, and Construction;
5. Communication.

Teaching Methodologies (including assessment):
The studies to be carried out in this course unit will be based on the development of projects and research on the theme of Housing. Within the scope of 'theoretical-practical classes,' expository, descriptive, and demonstrative techniques will be employed, based on the analysis of specific case studies as well as the intersection of themes sparked by the design exercises. Within the 'practical laboratory classes,' students will receive individual and group guidance to discuss their work. Collective debate and critique sessions will take place, utilizing expository methodologies integrated with graphic, written, and oral presentation elements of the project.
Assessment will be continuous , comprising 2 practical assignments (projects), 2 theoretical assignments, and student performance (attendance and participation, goal setting, meeting deadlines, and critical thinking).

Bibliography:
[1] Benevolo, Leonardo, Historia de la arquitectura moderna, Barcelona: Gustavo Gili, 1987.
[2]Ching, Francis D. K., Arquitetura : forma, espaço e ordem, São Paulo : Martins Fontes, 1998.
[3] Cullen, Gordon, Paisagem Urbana, Lisboa: Edições 70, 1993.
[4]Neufert, Ernst, Arte de projetar em Arquitetura, São Paulo : Gustavo Gili, 1998.
[5] Norberg-Schulz, Christian, Existencia, Espacio y Arquitectura, Ed. Blume, Barcelona, 1975.
[6] Oliveira, Avelino, A Casa Compreensiva: um percurso sobre a concepção arquitectónica das tipologias de habitação ed. Caleidoscópio, 2015.
[7] Quaroni, Ludovico, Proyectar un Edifício: Ocho lecciones de Arquitectura, Xarait, Madrid, 1980.

Construction Systems in Architecture III (2nd year, 3 ECTS)

Syllabus:
1 - Detailing Systems and Design of Construction Elements
1.1 - Foundations;
1.2 - Exterior walls;
1.3 - Interior walls;
1.4 - Exterior openings (windows and doors);
1.5 - Interior openings (doors and cabinets/closets);
1.6 - Slabs;
1.7 - Stairs;
1.8 - Roofs/Roofing systems.
2. Integrated Structural Systems
2.1 - Concrete construction;
2.2 - Timber/Wood construction;

2.3 - Brick/Masonry construction;
2.4 - Iron/Steel construction;
2.5 - Glass construction.
3. Details and Detailing
3.1 - Development of a systematized set of architectural details;
3.2 - Preparation of execution project instruments: schedules, data sheets, specifications, etc.;
3.3 - Research, surveying, and fieldwork.

Teaching Methodologies (including assessment):
The teaching methodology seeks to align the work developed by the student with the professional practice of architecture. Students are challenged to develop their construction knowledge and architectural culture by revisiting a project designed during an earlier stage of their academic career-rethinking and detailing it based on new knowledge while responding to the comfort and energy efficiency standards commonly associated with contemporary requirements.
The course assessment is based on a continuous assessment model with a comprehensive exam. Continuous assessment is structured into two components: Practical Work (80% of the final grade) and a Comprehensive Exam (20% of the final grade).
The practical work is organized into four progress reviews and a final submission.

Bibliography:
[1] Addis, Bill (2007), Building: 3000 Years Of Design Engineering And Construction, London, Phaidon
[2] Allen, Edward (1997), Como Funciona Un Edificio, Barcelona, Editorial Gustavo Gili
[3] Deplazes, Andrea (Editor) (2005), Constructing Architecture. Materials Processes Structures: A Handbook, Basel, Birkhäuser.
[4] González, Jose Luis (1997), Claves Del Construir Arquitectónico, Tomo I, Ii E Iii, Barcelona, Editorial Gustavo Gili
[5] Herzog, Thomas (2004), Timber Construction Manual, Basel, Birkhäuser
[6] Mascarenhas, J. (2011), Sistemas De Construção I; II; III; IV; V; VI; VII; VIII; XIX; X, Coleção Técnicas De Construção, Livro Horizonte
[7] Mittag, M. (1978), Pratique De La Construction Des Bâtiments, Paris, Ed. Eyrolles
[8] Neufert, Ernest (1987), Arte De Projetar Em Arquitectura, Barcelona, Editorial Gustavo Gili
[9] Oliveira, Ernesto Veiga De (1992), Arquitectura Tradicional Portuguesa, Lisboa, Publicações Dom Quixote
[10] Pfeifer, Gunter (2001), Masonry Construction Manual, Basel, Birkhäuser
[11] Kind-Barkauskas, Friedbert (2002), Concrete Construction Manual, Basel, Birkhäuser
[12] Schmitt, Heinrich (1997), Tratado De Construcción, Barcelona, Editorial Gustavo Gili
[13] Schulitz, Helmut C. (2003), Construire En Acier, Lausanne, Presses Polytechniques Et Universitaires Romandes
[14] Schunck, Eberhard (2003), Roof Construction Manual, Basel, Birkhäuser
[15] Tacla, Zake (1984) O Livro Da Arte De Construir, Unipress, São Paulo

Digital Tools I (2nd year, 6 ECTS)

Syllabus:
The course focuses on the technical and critical study of the digital tools AutoCAD (for 2D technical drawing) and Rhinoceros 3D (for three-dimensional modelling applied to architecture). The course content is divided into:

- Introduction to CAD environments and 3D modelling
- Technical drawing in AutoCAD: basic commands, layers, dimensioning, printing, graphic standards.
- Standard 2D drawings: plan, section and technical elevation.

- Modelling in Rhinoceros: NURBS, SubD, Boolean operations, views and perspectives.
- Extracting elements from the 3D model: sections, views, export to various formats.
- Integrated workflows between CAD and modelling.
- Graphical presentation and basic visualisation of the architectural model.

Teaching Methodologies (including assessment):
The methodology combines:
- Theoretical and practical classes featuring an introduction to concepts and demonstrations.
- Practical laboratory sessions involving applied exercises and project development.
- The course promotes 'learning by doing', peer review and the development of technical skills aligned with professional practice.

Assessment follows the current academic regulations and consists of:
- Practical Assignment 1 - 2D technical drawing (AutoCAD): 40%
- Practical Assignment 2 - 3D modelling and graphic rendering (Rhinoceros): 40%

Note: The average of the two assignments must be ≥ 9 to be eligible for the theoretical test - comprehensive exam.

Bibliography:
[1] Dogra, S. (2024). AutoCAD 2025: A Power Guide for Beginners and Intermediate Users.
[2] Aarhus, J. (2024). AutoCAD 2025: Best Practices, Tips, and Techniques.
[3] Bryant, S. (2023). Mastering AutoCAD.
[4] Hamad, M. M. (2025). AutoCAD 2025: Beginning and Intermediate.
[5] Zamora, H. (2019). 34 AutoCAD Tips to Become a Power User. Autodesk Official Blog.
[6] Monteiro, J. (2022). Modelação Clássica e por Subdivisão em Rhinoceros 7.
[7] Costa, R. (2018). Desenho Técnico para AEC. Engebook.
[8] Ching, F. D. K. (2015). Desenho para Arquitetos. Bookman.

Architecture, Ecology and Environmental Health (2nd year, 3 ECTS)

Syllabus:
1. Introduction to architecture and ecology
1.1 Definition and fundamental concepts
1.2 The relationship between the built environment and the natural environment
1.3 The role of the architect in environmental sustainability
1.4 Introduction to the concept of biophilic design and integration with nature
2. Principles of sustainability in architecture
2.1 Concepts in sustainable architecture
2.2 Environmental impact of building materials (life cycle analysis)
2.3 Ecological and healthy materials: recycled, renewable, local and with a low carbon impact
2.4 Emerging technologies
3. Environmental comfort and well-being
3.1 The influence of architecture on the mental health and well-being of occupants
3.2 Thermal and acoustic comfort of buildings
3.3 Indoor air quality
3.4 Inclusive and accessible design for all
4. Efficiency in the built environment
4.1 Energy management systems in buildings
4.2 Zero Energy Buildings (ZEB) and carbon neutral buildings
4.3 Sustainable water management in the built environment
4.4 Environmental certifications (LEED, BREEAM, Passive House)
5. Ecological urbanism and public health

5.1 Urban ecology: green spaces, ecological corridors and biodiversity in urban areas
5.2 Impacts of urban environments on physical and mental health
5.3 Sustainable mobility
5.4 Urban heat islands and their impact on local climate and health
6. Climate challenges and adaptability in architecture
6.1 Impacts of climate change on the built environment
6.2 Adaptive and resilient architecture to extreme conditions
6.3 Designing buildings resilient to natural disasters
6.4 Climate change and public health: planning and mitigation

Teaching methodologies:
Expositive, interrogative and demonstrative. Guided case studies are used to enable the theoretical knowledge acquired to be correctly interpreted and applied to real situations.
Assessment is continuous, consisting of individual assessment tests and a thematic assignment, to be carried out during the semester, and a final comprehensive exam.

Bibliography:
[1] Ching.F (2015). Arquitetura Ecológica. Un Manual Ilustrado .Barcelona; Editorial Gustavo Gili, SA.
[2] Faria, Luís Pinto de. (2020). "Espaço e Saúde: Responsabilidade e Consequência". Plataforma Barómetro Social.
[3] Fernandez-Galiano (2010). Mas por menos. In Arquitectura Viva, "La otra globalización,una estética de lo necesario"; n.º 133.
[4] Gauzin-Muller, Dominique (2002). Arquitectura Ecológica. Barcelona; Editorial Gustavo Gili SA.
[5] Gissen, David, Ed. (2002). Big & Green : toward sustainable architecture in the 21st century. New York; Princeton Architectural Press.
[6] Lingsom, S. (2012). "Public space and impairment: an introspective case study of disabling and enabling experiences". Scandinavian Journal of Disability Research, Vol. 14, Iss. 4, pp. 330-331.
[7] Morin, Edgar (2008). Introdução ao Pensamento Complexo. 5. ed. Lisboa: Instituto Piaget.

Project V (3rd year, 12 ECTS)

Syllabus:
The exercise proposed in the Curricular Unit "Project V" aims at the design of an urban facility with a demanding programme and significant contextual complexity-a museum of emotions-on the site of the "Marine Zoology Station" (1914), also known as the "Foz Aquarium", located on Avenida de Montevideu, in the parish of Nevogilde, Porto.
The proposed exercise seeks to stimulate an awareness of the spatial and formal repercussions of the project within the urban context it aims to transform and to which it responds, presenting it as a synthesis of the disciplinary relationship between Place, Programme and Construction.
Starting from the construction of the "idea" as the structuring and guiding response for the different phases of the project, the proposed exercise promotes the development of a work of architectural synthesis (programmatic, contextual, functional, constructive and formal) that enables the student not only to deepen the knowledge (conceptual and methodological) indispensable to the formalisation of a design response, but also to acquire a well-grounded capacity for critical reflection on the project.

Teaching Methodologies (including assessment):
Under the theme "From Territory to the Architectural Object", the studies to be undertaken in this curricular unit will be based on research carried out at different scales on a single theme-FACILITY-placing the programme of the architectural intervention to be developed within a real urban context that makes it possible to highlight and relate the various stimuli and constraints that characterise any

design exercise. Within this framework, a proposal will be developed for the transformation of a pre-existing urban reality, in which the interdependence between urban insertion, urban morphology and architectural typology will be analysed and formalised.
Students are expected to develop their work in the classroom environment, using manual materials and techniques during scheduled contact hours, in conjunction with the research carried out outside contact hours.
The final assessment for this curricular unit will be: 1st progress review (20%) + 2nd progress review (20%) + final submission (60%). Each assessment moment consists of the presentation, critique and collective discussion of the work.

Bibliography:
[1] Adam, R. (2001). Princípios do Ecoedifício. Rio de Janeiro: Editora Aquariana
[2] Borasi, Giovana, Ed. (2015). The Other Architect : another way of building architecture. Québec : Canadian Centre for Architecture ; Leipzig : Spector Books.
[3] Moneo, R. (2004). Inquietud Teorica e Estrategia Proyetual. ACTAR:Barcelona: Editorial Gustavo Gili, S.A.
[4] Montaner, J. M. (2009). Sistemas arquitetônicos contemporâneos. Barcelona : Gustavo Gili
[5] Norberg-Schulz, C. (2001). Intenciones enarquitectura. Barcelona. Gustavo Gili SA.
[6] Figueira, Jorge, 1965-Escola do Porto : um mapa crítico / Jorge Figueira. - Coimbra : Edarq - Departamento de Arquitectura da FCTUC, 2002. - 147 p. ; 24 cm. - (Debaixo de Telha. Série B ; 5).

Structural Systems (3rd year, 3 ECTS)

Syllabus:
1. Introduction
1.1 General considerations
1.2 Problem structural relation to architectural design
2. Types and structural elements
2.1 Laminar Structures
2.2 Framed Structures
2.3 Special Structures
3. Structural materials
3.1 Steel
3.2 Concrete
3.3 Wood
3.4 Other materials
4. Structural mechanics
4.1 Essential concepts in the behavior of structures
4.2 Diversity of forces on structures
4.3 Internal forces: axial force and bending moment
4.4. Buckling
5. Safety criteria and loads
5.1. Classification, Quantification and Combination of loads
5.2. Ultimate limit states
5.3. Service limit states
5.4. Safety criteria checking
6. Concrete framed structures: Definition, Preliminary design and Regulatory aspects
6.1 Beams
6.2 Pillars
7. Laminar structures in reinforced concrete: Definition, Preliminary design and Regulatory aspects
7.1 Slabs

7.2 One/two way spanning slabs
7.3 Precast concrete slabs (flat slabs)

Teaching Methodologies (including assessment):
The curricular unit is structured in lectures, where the theoretical contents are presented and classes with a theoretical-practical character, where the discussion of concepts and the analysis of study cases are promoted. Simultaneously, support is given to an academic project, that consists in the development of the structural design of a house.
The assessment process consists of the assessment of 2 written tests and the outcome of an academic project (structural design of a house).

Bibliography:
[1] Heino Engel, "Sistemas estruturais", Editorial Gustavo Gili, SA, 2002.
[2] Beer and Johnson, "Mecânica Vectorial para Engenheiros - Estática", McGraw-Hill, 1991.
[3] Slides das aulas.
[4] Regulamento de Segurança e Ações em Edifícios e Pontes, Porto Editora, 1983.
[5] Eurocódigo 2 - Projecto de Estruturas de Betão, EN 1992-1-1, CEN, 2010.
[5] Regulamento de Estruturas de Betão Armado e Pré-esforçado, Porto Editora, 1983.
[6] Eurocódigo

Compatibility, Coordination and Project Management (3rd year, 3 ECTS)

Syllabus:
1. Fundamentals of Professional Architectural Practice
2. Conception and development of basic programmes
3. Preliminary studies and feasibility assessment
4. Interdisciplinary Coordination and Integration
5. Regulatory frameworks and licensing procedures
6. Principles of project management
7. Development of the construction design and technical documentation
8. Client relations and stakeholder management
9. Final presentations
10. Case studies and critical analysis

Teaching Methodologies (including assessment):
The teaching approach comprises a combination of theoretical and practical classes, teaching tools and collaborative working sessions, designed to foster an environment of critical inquiry and the acquisition of practical skills. The emphasis is on problem-based learning, with students engaging in complex, simulated project scenarios that require the application of coordination and management principles. Teaching utilises technological research and design tools, including BIM software and project management platforms, to enhance experiential learning. Academic discourse is encouraged through the critical analysis of contemporary case studies and engagement with panel discussions that link theoretical constructs to practical application.
Assessment: Integrated project = 80%, comprehensive exam = 20%

Bibliography:
[1] Emmitt, S. (2016). Design Management for Architects. Wiley-Blackwell.
[2] Fewings, P. (2013). Construction Project Management: An Integrated Approach. Routledge.
[3] Lock, D. (2017). Project Management. Gower Publishing.
[4] RIBA (2013). RIBA Plan of Work 2013. RIBA Publishing.

[5] Current Portuguese legislation

Urban Intervention Project I (4th year, 12 ECTS)

Syllabus:
1. Territorial analysis and urban paradigms
1.1 “Urban fabrics” and “morphological territories”: Elements of Urban Composition, Compact City/Modern City/Garden-City, Scales of analysis and project
1.2 Urban analysis: mobility and road hierarchy, “urban” fabrics (typologies, forms and functions), natural and built heritage, land uses and equipments, structure of public spaces, ecological structure
2. Urban restructuring and urban forms
2.1 Urban Setting
2.2 (Elements of) Urban structure
2.3 Urban fabrics and elements’ inter-relation
2.4 Urban Morphology/Typology of Urban Spaces
2.5 Form/function articulation
3. From concept to normative instruments
3.1 Order and freedom in urban regulation
3.2 Design and regulation
3.3 The adoption of regulation variables

Teaching Methodologies (including assessment):
The methodology consists, essentially, of tutorial guidance, supported and complemented by lectures and collective class debates. In parallel with the project development, three short-span exercises are proposed: one of a practical nature that directly feeds the project's process, and two of a theoretical character that require critical thought about the ongoing work.
The assessment method is divided in two components: the practical-experimental component – that integrates two project presentations, one exercise of space definition at the construction level and the assessment of the student’s performance throughout the semester – and the theoretical component, based on two exercises – the critical analysis of a public space, similar in scope to the project's, and the elaboration of an individual portfolio.

Bibliography:
[1] Cullen, Gordon (1996). Paisagem Urbana. Lisboa. Edições 70 (Ed. Orig. 1971).
[2] Kostoff, Spiro (1991). The city shaped: urban patterns and meanings through history. London: Thames and Hudson.
[3] Lynch, Kevin (1999). A boa forma da cidade. Lisboa. Edições 70 (Ed. Orig. 1981).
[4] Lynch, Kevin (1999). A imagem da cidade. Lisboa. Edições 70 (Ed. Orig. 1960).
[5] López de Lucio, Ramón (2007). Construir Ciudad en la Periferia. Madrid. Mairea Libros.
[6] Masboungi, Ariella; Manguin, David (2009). Agir sur les grands territoires. Paris: Le Moniteur.
[7] Panerai, Philippe et al (1999). Analyse urbaine. Marseille. Éditions Parenthèses.
[8] Rodrigues, José Manuel (coord.) (2010). Teoria e crítica de arquitectura: século XX. Lisboa: Ordem dos Arquitectos.
[9] Schenk, Leonhard (2013). Designing Cities. Basics, principles, projects. Birkhauser.
[10] Secchi, Bernardo (2006). Primeira lição de urbanismo. São Paulo. Editora Perspectiva (Ed. Orig. 2000).

Landscape Architecture (4th year, 6 ECTS)

Syllabus:

1. The concept of landscape.
2. The object, scope, and scales of intervention in Landscape Architecture.
3. Elements of the landscape: physical (topography, vegetation, water, built structures) and intangible (light, wind, color, temperature, sky). Landscape experience: enjoyment, movement, perception.
4. Concepts, values, and philosophies of intervention in the landscape: territory, nature, context, site, system, dynamics, sustainability, authenticity, culture, ecology, aesthetics, and ethics; *genius loci*, *continuum naturale*, and *continuum culturale*; global landscape.
5. The biotic, abiotic, and cultural factors responsible for landscape diversity. The evolution of the landscape.
6. The Portuguese landscape: diversity, typologies, and dynamics.
7. Public policies and legislation: the European Landscape Convention, the legal framework in Portugal. The relationship with nature and biodiversity conservation.
8. Landscape planning and management: methodology of analysis, synthesis, and proposal; landscape units and character. Landscape characterization and assessment studies.
9. Open space in the city: typologies of urban green spaces. Ecological structure, green corridors, and green infrastructure.
10. Case studies in Landscape Architecture: urban parks and large metropolitan parks (national and international).
11. Contemporary challenges: climate change, health and well-being, gentrification, equity, and landscape justice.

Teaching Methodologies (including assessment):
Lectures (introduction and systematization of fundamental content).
Analysis of national and international case studies and projects.
Guided group discussion of scientific articles.
Problem-based learning (critical analysis and future-oriented vision exercises).
Field observation and recording (graphic-analytical journal of a green space/garden).
Assessment: group discussion of a scientific article (20%), graphic-analytical journal in pairs (35%), creative future vision exercise in pairs (25%), comprehensive exam (20%)

Bibliography:
[1] Andresen, Teresa (coord. ed.) (2003). Do Estádio Nacional ao jardim Gulbenkian: Francisco Caldeira Cabral e a primeira Geração de Arquitectos Paisagistas (1940-1970). Lisboa: F. C. Gulbenkian.
[2] Bell, S.; Landscape: Pattern, Perception and Process, Routlege, 2012
[3] Berengo, Cecília; Di Maio, Sara (2008) Nós Somos a Paisagem. Compreender a Convenção Europeia da Paisagem. Giunti. Projectti Educativi. Ed portuguesa. Lisboa: APAP.
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Courses offered during Spring semester (academic year 2026-27)

Drawing II (1st year, 6 ECTS)

Syllabus:
1. The representation of space
1.1 Drawing of the place
1.2 Drawings with multiple vision
1.3 Graphics Systems of representation
2. Architectural Drawing
2.1 Conception drawing of the Shape and seizure of the built context
2.2 Dimensions, shapes and movements
2.3 Adaptation of the drawing to the creative process
3. Systems notions and use of color concepts
3.1 The use of color in history
3.2 The use of color on the architectural object
3.3 Structure of the Color
3.4 The visible colors spectrum
3.5 Chromatic Circle or circle of colors

Teaching Methodologies (including assessment):
Throughout the semester will be explained theoretical contents in the classes, which will result in the development of practical exercises.
The assessment method is based on the continuous assessment model and involves the practical component resulting from developed exercises carried out inside and outside of space/time of the classroom.

Bibliography:
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[11] Ching, Francis D. K. (1999), "Dibujo y proyeto", México, Gustavo Gili

Project II (1st year, 12 ECTS)

Syllabus:
1. Graphic representation of the architectural object and its context;
2. Ways of living and uses of domestic space;
3. Urban integration of the built environment;
4. Comfort conditions of the living space (dimensioning, scale, proportion, light, privacy, ergonomics);
5. Construction systems and their plastic expression;
6. Interior/exterior relationship.

Teaching Methodologies (including assessment):
The "practical laboratory classes," where projects will be carried out and critiqued individually, will be complemented, at opportune moments, by collective debate/critique sessions for comparison and possible redirection. Simultaneously, "theoretical classes" will be held where the information provided will seek to ensure the indispensable critical broadening and foundation of the produced design. Study visits to exhibitions and/or works of reference architecture will be organized to support the justified discussion of architectural experience. Sessions will be held for the presentation and discussion of experiences of colleagues of recognized professional merit, emphasizing the diversity of possibilities in the exercise of the profession. The knowledge and skills acquired by the student will be synthesized in the graphic, written, and oral presentation of the project, as well as in the presentation/debate.
The course unit's assessment method is based on a continuous assessment model and comprises two components: a practical component and a theoretical component. Student participation in teaching contact hours is, as a rule, mandatory. Regarding in-person classroom teaching hours, the minimum attendance percentage is stipulated in the "Academic Regulations for the Operation of Bachelor's and Integrated Master's Degrees". There is no resit assessment for this course unit.

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[1] Quaroni, Ludovico, "Proyectar un Edificio: Ocho lecciones de Arquitectura", Madrid, Ed. Xarat.
[2] Tavora, Fernando, "Da Organização do Espaço", 2ª Ed. ESBAP, 1982
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[5] Frampton, Kenneth "Introdução ao estudo da cultura tectónica" / Kenneth Frampton
Lisboa : Associação dos Arquitectos Portugueses, 1998.
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Gili, 1998.
[7] Fernandes, Fátima Guia da arquitectura moderna : Porto : 1925-2002. - Porto : Asa, 2002.
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[9] Hossbach, Benjamin Competition panels and diagrams. - [S.l.] : Dom Publishers, 2016.

Construction Systems in Architecture II (1st year, 3 ECTS)

Syllabus:
1. Construction to the beginning of century 20
1.1 Introduction to vernacular architecture
1.2 Materials and traditional construction techniques
2. Systems and elements of detail design construction
2.1 Foundations
2.2 External walls
2.3 Interior layout
2.4 Outdoor openings (windows and doors)
2.5 Interior spans (doors)
2.6 Slabs
2.7 Stairs
2.8 Coverage
3. Analysis of structural systems integrated
3.1 Concrete Construction
3.2 Wood construction
3.3 Brick construction
3.4 Iron Construction
3.5 Glass Construction
4. Detail and accuracy
4.1 Developing a systematic set of architectural details

Teaching Methodologies (including assessment):
The "practical classes" prioritize the referral of the student, especially in the execution of the proposed exercises, so that it achieves the objectives of this curricular unit. The student should expose the development of his works, fostering, in this way, moments of criticism, dialogue and collective reflection.
Theoretical classes should substantiate and support the practical classes through a brief exposition of the subjects and themes associated with them.
The knowledge and skills acquired by the student will be synthesized in graphic, written and oral exposition, as well as in the presentation / debate related to four assessment moments in the dates to be scheduled.

Bibliography:
[1] Mittag, M. (1978), Pratique de la construction des bâtiments, Paris, Ed. Eyrolles
[2] Schmit, H. (1997), Tratado de Construcción, Barcelona, Editorial Gustavo Gili
[3] Allen, E. (1997), Como Funciona un Edificio, Barcelona, Editorial Gustavo Gili
[4] Mascarenhas, J. (2011), Sistemas de Construção I; II; III; IV; V; VI; VII; VIII; XIX; X, Coleção Técnicas de Construção, Livro Horizonte

Social and Urban Anthropology (1st year, 3 ECTS)

Syllabus:
1.Anthropology: definition
1.1 Social Anthropology
1.2 Urban Anthropology
2. Space: critical thinking of the concept
2.1 Henri Lefebvre and the production of space
2.2 Michel Foucault and panoptism

2.3 Kevin Lynch and the image of the city
2.4 Michel de Certeau and tactics and strategy
3. Analysis of the book: Wallman, S. (2011) The Capability of Places - methods for modelling community response to change and intrusion
3.1 London
3.2 Rome
4. Porto as a case study:
4.2 Grass roots horticultural urban patches
4.3 Heritage, tourism and gentrification

Teaching Methodologies (including assessment):
Teaching based on theoretical lectures and practical work (case studies).
The nature of items 1 and 2 is eminently theoretical, which is consistent with the type of classes; assessment through practical assignments (items 1 and 2 of the syllabus) aims to develop the practical application skills referred to in the Objectives. Students must therefore develop: the ability to collect, select, and interpret relevant information, particularly in their field of study, enabling them to justify the solutions they propose and the judgments they make, including relevant social, scientific, and ethical aspects in their analysis; and develop skills that allow them to communicate information, ideas, problems, and solutions to audiences consisting of both experts and non-experts.
Assessment: group work = 40%, group work = 40%, comprehensive exam = 20%

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[1] Lynch, K, (1999), A imagem da cidade. Lisboa: Edições 70
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[3] Seixas, P Castro, (2017) Urbanismo, cultura e globalização em Portugal, Revista Brasileira de Gestão Urbana (3).pp 55-71.
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[5] Santos, P M. e Seixas, P. C. (ed) (2014) Globalization and Metropolization, Berkeley, CA: Inst Governmental Studies/Univ of California, Berkeley.
[6] Santos, P M, (2017),Tourism and the critical cosmopolitanism imagination: 'The Worst Tours' in a European World Heritage city, International Journal of Heritage Studies.
[7] Santos, P M, (2017),The concept of 'first-place' as an Aristotelean exercise on the Metaphysics of Heritage. International Journal of Heritage Studies, 24:2, 121-127.
[8] Wallman, S. (2011) The Capability of Places – methods for modelling community response to change and intrusion. Pluto press

Construction Systems in Architecture IV (2nd year, 3 ECTS)

Syllabus:
1. Construction System of Old Buildings
1.1 Introduction
1.2 Old House in Porto (17th-19th centuries)
1.3 Constructive Characterization of Old Buildings
1.3 Stone Masonry
1.4 Wood
1.5 Practical Work 1
2. Inspection and Diagnostic Techniques
2.1 Introduction
2.2 Historical Data Collection and Analysis

2.3 Identification of Structural Damage
2.4 Geometric and Material Characterization
2.5 Practical Work 2
3. Intervention in old stone masonry buildings
3.1 Objectives and reinforcement
3.2 Applicability of reinforcement interventions
3.3 Concerns inherent in an intervention/reinforcement process
3.4 Rehabilitation/reinforcement techniques
3.5 Structural solutions
3.6 Practical Work 3

Teaching Methodologies (including assessment):
The methodology of this course unit is based on theoretical classes, articulated with moments of collective discussion, but also includes tutorial classes, accompanying the student in the preparation of rehabilitation works to be developed throughout the semester.
The assessment method is divided into two components: the theoretical-practical/practical-laboratory component, which includes the final presentation of the project, three short thematic exercises and the assessment of the student's performance throughout the semester; and the theoretical component, which is based on a written test. The grade obtained results from the classification assigned to these various assessment moments, which will be counted in different percentages.
The assessment has 2 components: practical work = 80%, comprehensive exam = 20%

Bibliography:
[1] Almeida, C. – Paredes de Alvenaria do Porto. Tipificação e Caraterização Experimental, Tese de Doutoramento Faculdade de Engenharia da Universidade do Porto, Porto, 2013.
[2] Broto, C. – Rehabilitated buildings, Instituto Monsa de Ediciones, Barcelona, 1997.
[3] Casella, G. – Gramáticas de Pedra – Levantamento de Tipologias de Construção Muraria, Centro Regional de Artes Tradicionais, 2003.
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5] Pagaimo, F. – Caracterização Morfológica e Mecânica de Alvenarias Antigas: Caso de estudo da Vila de Tentúgal, Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Departamento de Engenharia Civil, 2004.
[6] Roque, J. – Reforço e reabilitação estrutural de paredes antigas de alvenaria, Tese de Mestrado, Universidade do Minho, 2002.
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[10] Oliveira, E., Galhano, F. – Portugal de Perto. Arquitectura Tradicional Portuguesa, Dom Quixote, Lisboa, 2003.
[11] Rodrigues, A. – História Breve da Engenharia Civil, Porto, OERN, 2006.

Project IV (2nd year, 12 ECTS)

Syllabus:
1. On Housing in the Construction of Urban Fabrics
1.1 Models and references;
1.2 Public space typologies;
1.3 Appropriation of urban space;

2. Program, Methodology, and Data Collection
2.1 Shaping elements: topography, roads, and pathways;
2.2 Program and functional distribution;
2.3 Dimensions of the intervention area and programmatic space;
2.4 Pre-existing typo-morphological relationships and options for continuity/rupture;
2.5 Theoretical foundation of the project;
3. On Housing Typologies
3.1 Modulation and formal configuration;
3.2 Typological organization systems;
3.3 Universal accessibility;
4. On the Technical Dimension of Construction
4.1 Structural system;
4.2 Thermal and acoustic comfort;
4.3 Fire Safety;
4.4 Infrastructure networks;
5. On Complementary Activities
5.1 Sketching (Esboceto);
5.2 Fieldwork;
5.3 Research of paradigmatic or exemplary architectural models;

Teaching Methodologies (including assessment):
Theoretical lectures will employ expository, descriptive, and demonstrative techniques. In the practical-laboratory design sessions, students will receive both individual and collective guidance through work discussions. During collective debate and critique sessions, expository methodologies will be used, integrated with elements of graphic, written, and oral project presentation.
Assessment: practical work = 70%; theoretical-practical work = 25%; student performance = 5%

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[1] Ching, Francis D. K., Dicionário visual de arquitectura, México: Ed. GG.
[2]Quaroni, Ludovico, Proyectar un Edifício: Ocho lecciones de Arquitectura, ed. Xarait, Madrid, 1980.
[3] Rossi, Aldo, La arquitectura de la ciudad - Barcelona: ed. GG, 1995.
[4]Arís, Carlos Martí (editor), Las Formas de Residencia en la Ciudad Moderna, Barcelona, ed. UPC, 2000.
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[6] Benevolo, Leonardo , La descripción del ambiente, Barcelona : Ed. GG, 1982.
[7] Lengen, Johan van, (2010), Manual do Arquiteto Descalço, Lisboa, Dinalivro.
[8] Oliveira, A. (2015) A Casa Compreensiva, Caleidoscópio.

Digital Tools II (2nd year, 6 ECTS)

Syllabus:
1. Theoretical Introduction to BIM
1.1 Fundamentals of BIM methodology.
1.2 Difference between representation and virtualization.
1.3 BIM dimensions and interdisciplinary collaboration.
1.4 Interoperability and data exchange.
1.5 Levels of Development (LOD).
2. BIM Modeling with Archicad
2.1 Software interface and workspace organization.
2.2 Basic modeling tools.
2.3 Structuring and managing information within a 3D model.

2.4 Best practices for model structuring.
3. Project Documentation and Presentation
3.1 Extracting technical drawings from the BIM model.
3.2 Generating technical documentation and graphic representation.
3.3 Development of presentation boards.
3.4 Preparing documentation for interdisciplinary coordination.

Teaching Methodologies (including assessment):
Theoretical lectures: Introduction and discussion of BIM concepts and their professional applications.
Practical lab sessions: Demonstration of Archicad tools, followed by hands-on modeling exercises with instructor support.
Practical project: Students will model a selected architectural case study up to LOD 3, producing technical drawings and a presentation board.
Ongoing review and feedback: Regular assessment of student work to encourage self-critique and continuous improvement.
Assessment: theoretical test = 20% of the final grade, individual practical work = 80% of the final grade), comprehensive exam.

Bibliography
[1] Eastman, C., Teicholz, P., Sacks, R., Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors. Wiley.
[2] Penttilä, H. (2007). BIM and Architectural Design. Helsinki University of Technology.
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[4] Krygiel, E., Nies, B. (2008). Green BIM: Successful Sustainable Design with Building Information Modeling. Wiley.

Analysis of Architectural and Urban Space (2nd year, 3 ECTS)

Syllabus:
Variables for analyzing architectural and urban space:

- Spatial perception: Gestalt principles (proximity, similarity, continuity, closure, figure-ground, common area, focal point); rule/exception; sound; texture; smell.
- Delimitation (permeability; thickness, radiance) and spatial articulation (subdivision and interpenetration; centrality/linearity; public/private; systems of views and paths: raumplan/open plan/infinite space; indeterminism)
- Main variables in the manipulation of spatial characterization (light and color, scale and proportion, full/empty, materials and texture, concave and convex, repetition and rhythm);
- Geometry (ideal geometry and geometry of being; orthogonality, horizontal and vertical; line, plane and volume; regular geometric forms; grids and axes; symmetry and asymmetrical balance, special proportions; parallel walls);
- Function (functional zones, hierarchy, served and service spaces; functionalism; diversity, polyvalence and appropriation);
- Context (topography; roads, cadastral mapping, buildings; urban fabrics, alignments; organic/mineral; architectural culture);
- Typologies: type/model; history of functional types; functionalism, quantification and typified solutions; type-morphology)
- Tectonics: structure/spatial structure; plastic expression of technical elements; joints and transitions; decomposition into constructive elements;
- Allegory and metaphor: synthesis in the understanding of space.

- Paradigmatic cases of the analysis of architectural space and the use of drawing as an analytical tool: Unwin, Ching, Bacon, Panerai, Jacobs, Eisenman, Lucan, Pallasmaa.

Teaching Methodologies (including assessment):
Students will be challenged to carry out theoretical/practical work analyzing a building and an urban space. These analyses will be conducted throughout the semester, in parallel with presentation and discussion sessions on the various structuring themes of the course content. At the conclusion of each exercise, students will present their work to their peers, thus reinforcing the scope of each student's experience. In addition to the typological diversity of the case studies in each exercise, one exercise will be based on a case to which the student has physical access.
Assessment: student work will be evaluated based on: quality of data collection; scope of analysis; ability to communicate results graphically and in writing; and ability to present and discuss the work orally.
Each theoretical-practical assignment will have a weighting of 42.5% in the final grade. Additionally, and in accordance with UFP academic regulations, a comprehensive assessment exam will be conducted at the end of the semester, accounting for 15% of the continuous assessment grade. If the continuous assessment is negative, the comprehensive exam serves as a recovery opportunity, worth 100%.

Bibliography:
[1] Unwin, Simon Analysing Architecture: The universal language of place-making (Analysing Architecture Notebooks) Routlege 2020
[2] Arquitectura : forma, espacio y orden / Francis D. K. Ching - 11ª ed. - México : Gustavo Gili, 1998.
[3] Radford, Antony et al. The elements of modern architecture: understanding contemporary buildings. London: Thames & Hudson, reimp. 2015.
[4] Schwartz, Chad Introducing architectural tectonics, exploring the intersection of design and construction Routledge 2017
[5] Pallasmaa, Juhani MCCARTER, Robert Understanding architecture: a primer on architecture as experience - London: Phaidon, 2012
[6] Panerai, Philippe [et al.] Analyse urbaine Éditions Parenthéses 1999
[8] Baker, Geoffrey Harold. (2006). Design strategies in architecture: An approach to the analysis of form. Routledge.
[9] Bacon, Edmund N. (1976). Design of cities (Rev. ed.). Penguin Books.
[10] Clark, Roger H., and Michael Pause. (2012). Analysis of precedent: An investigation of elements, relationships and ordering ideas in the work of 8 architects. John Wiley & Sons.
[11] Von Meiss, Pierre (1990). Elements of architecture: From form to place. Van Nostrand Reinhold.
[12] Jacobs, Allan B. (1993). Great streets. Cambridge, MA: MIT Press

Project VI (3rd year, 12 ECTS)

By the end of the semester, the student should be able to:

- Produce a diagnosis of the main constraints affecting a given urban area, including a morpho-typological analysis of the intervention area;
- Develop a conceptual framework for territorial intervention, duly informed by the theoretical and built references addressed in class and/or indicated in the recommended bibliography for the course unit, as well as by the theoretical-practical knowledge and skills accumulated throughout previous semesters;
- Prepare a building proposal for a specific delimited area, within the particular constraints of a clearly defined physical and cultural context, relating to/integrating a specific functional programme (facility) within the context of the constraints of the “Place”;

- Articulate the relationship between the conceptual, formal, and linguistic aspects of the design and the applicable legal and regulatory requirements, together with the programme-related, functional, and constructive options of the proposal.
- Select methods, tools, and design scales appropriate to the specific requirements of the different stages of project development.
- Formalise the proposal at scales 1:500, 1:100, 1:50, and 1:10, and organise a standard licensing dossier including all written and drawn project documentation.

Teaching Methodologies (including assessment):
The syllabus content and pedagogical objectives of these course units follow a methodological path that begins in the 1st semester under the theme "from territory to architectural object" and continues in the 2nd semester under the topic "from project to construction". In this subject, the development of an architectural intervention will be promoted which, by virtue of its specificity and complexity, will enable the student to deepen some of the composition and design skills acquired during the 1st semester, particularly with regard to the linguistic and constructive aspects of the proposal and their correlation with the architectural gesture and with the culture, identity, and morpho-typological characteristics of the urban area under intervention.
Assessment: 1st progress review (20%) + 2nd progress review (20%) + final submission (60%).

Bibliography:
[1] Cri-Nu (2017) "Alguns Factos e Números sobre as Pessoas com Deficiência". Centro Regional de Informação das Nações Unidas Avaliable: https://www.unric.org/pt/pessoas-com-deficiencia/5459
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[3] Faria, L, (2019). "Compreender para Capacitar: novos desafios". In MOURA, Cláudia (Coord..)."O Perfil no mosaico da intervenção gerontológica". Publicações Seda.
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[5] Oliveira, A.; Ferreira, J.; Faria, L. (2020). Cidade Compreensiva entre a Cidade Representativa e a Cidade do Quotidiano. In A Obra Nasce: revista de Arquitetura e Urbanismo da Universidade Fernando Pessoa, nº14, dezembro 2020, pp.101-109.

Legislação
[1] Regulamento Geral das Edificações Urbanas (RGEU).
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[3] Portaria n.º 35-A/2022 de 14 de janeiro

Territory Arrangement and GIS (3rd year, 3 ECTS)

Syllabus:
1. Introduction to Planning and Territorial Thinking
    - Concepts and Methodologies: Definition of planning, its purposes, and the stages of a plan.
    - Demographic Analysis: The study of population as the foundation of planning; demographic projection methods.
    - Settlement Systems: City organization, urban networks, and the logic of land occupation.
    - Facilities and Infrastructure: Planning and location of basic services (health, education, technical networks).
2. Fundamentals of Geographic Information Systems (GIS)
    - Definition and Applications: GIS as a decision-support tool for the territory.
    - GIS Components: Software (QGIS), hardware, data, and methods.

- Legal and Regulatory Framework: The INSPIRE Directive and standards for spatial data infrastructures.

3. Data Models and Digital Cartography
   - Data Structure: Differences and applications of Vector and Raster (Matrix) models.
   - Reference Systems and Projections: Geodesy, coordinates (PT-TM06/ETRS89), and the importance of metadata.
   - Thematic Cartography: Principles of graphic semiology; creation of thematic maps (choropleth, graduated symbols).
   - Data Sources: Use of official repositories (SNIG, Base Cartography) in a planning context.
4. Geoprocessing Operations and Manipulation
   - Selection and Extraction: Selecting objects by attributes, by location, and extracting specific data.
   - Vector Spatial Analysis: Creation of proximity zones (buffers), intersection, and union of layers.
   - Image Geoprocessing: Introduction to the georeferencing of historical cartography or satellite imagery.
   - Photo-interpretation: Reading environmental and socioeconomic variables through orthophotomaps.
5. Management Instruments and Land Policies
   - The National Framework: Land Management Policy and the PNPOT (National Program for Spatial Planning Policy).
   - Municipal Plans (PDM, PU, PP): Structure and development of land use and constraint maps.
   - Urban Parameters: Calculation of indices (floor area ratio, waterproofing index) and practical exercises.
6. Urban Dynamics and Contemporary Challenges
   - City Life Cycle: Growth, consolidation, and urban development theories.
   - Territorial Impacts: Globalization, competitiveness between cities, and sustainability.
   - Urban Regeneration: New trends and the role of GIS in territorial requalification.
7. Applied Project (Case Study)
   - GIS Project Development: Collection, management, and manipulation of data for a real-world case.
   - Analysis and Presentation: Preparation of technical reports, critical analysis of plans, and presentation of results.

Teaching methods:

Formal and Demonstrative Presentation: Each session begins with the presentation of theoretical concepts, legal frameworks, and planning methodologies. In this phase, a demonstrative method is used to introduce software tools (QGIS), allowing students to visualize the direct application of these concepts within a digital environment.
Assessment: test, assignments and final project (80%), comprehensive exam (20%)

Bibliography:

[1] Bolstad, P. (2019). GIS fundamentals: A first text on Geographic Information Systems (6th ed.). XanEdu Publishing Inc.
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[4] Jensen, J. R., & Jensen, R. R. (2012). Introductory Geographic Information Systems. Pearson.

[5] Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Systems and Science (4th ed.). Wiley.
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Theories and Practices of Rehabilitation (3rd year, 3 ECTS)

Syllabus:
1. Fundamentals and Conceptual Evolution
1.1. Core Concepts
1.2. Historical evolution of the concept of Heritage
1.3. Heritage Charters, Conventions, and International Recommendations

2. Rehabilitation as an Urban Renewal Operation
2.1. Urban rehabilitation and building reuse
2.2. Limits of object transformation2.3. Context modification vs. radical context alteration
3. Traditional Construction in Portugal
3.1. Characterization of constructive elements in old buildings
3.1.1. Foundations
3.1.2. Load-bearing walls
3.1.3. Floors / Pavements
3.1.4. Roofs
3.2. Materials and main characteristics
3.2.1. Stone
3.2.2. Wood
4. Intervention in Old Stone Masonry Buildings
4.1. Inspection and diagnosis methodology
4.1.1. Data collection and historical analysis
4.1.2. Identification of structural damage
4.1.3. Geometric characterization
4.1.4. Material and structural characterization
4.1.5. Analysis and interpretation of results
4.2. Rehabilitation and structural reinforcement techniques
4.2.1. Masonry
4.2.2. Wood
4.3. Structural solutions
5. Interpretation of the Built Environment as a Rehabilitation Tool
5.1. The existing [structure] as a result of historical stratification
5.2. The existing [structure] as a design "guide"
5.3. Intervention as (yet) another layer of the existing [structure]
5.4. Contemporary challenges
6. Fieldwork

Teaching Methodologies (including assessment):
The methodology is based on theoretical lectures coordinated with collective discussion sessions. It also includes tutorial sessions to supervise students in the development of rehabilitation projects throughout the semester.
Assessment: practical assignments = 80%, comprehensive exam = 20%

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[20] Oliveira, E., Galhano, F. – Portugal de Perto. Arquitectura Tradicional Portuguesa, Dom Quixote, Lisboa, 2003.
[21] Rodrigues, A. – História Breve da Engenharia Civil, Porto, OERN, 2006.

Urban Intervention Project II (4th year, 12 ECTS)

Syllabus:

1. The analysis of public space and of the elements of space characterisation at an urban scale
1.1. Urban fabric(s) and urban space(s)
1.2. Modes/instruments and elements of urban characterisation
2. Restructuring and urban forms
2.1. Urban Setting
2.2. Urban Morphology
2.3. Typology of urban public spaces
2.4. Form/function articulation
3. Constructing urban space
3.1. Materialisation and uses
3.2. Design and regulation.

3.3. Comfort and urban equipment

Teaching Methodologies (including assessment):
The methodology of this CU consists, essentially, of tutorial guidance, supported and complemented by lectures and collective class debates. In parallel with the project development, three short-span exercises are proposed: one of a practical nature that directly feeds the project's process, and two of a theoretical character that require critical thought about the ongoing work.
The assessment method is divided in two components: the practical-experimental component – that integrates 2 project presentations, one exercise of space definition at the construction level and the assessment of the student's performance throughout the semester – and the theoretical component, based on 2 exercises – the critical analysis of a public space, similar in scope to the project's, and the elaboration of an individual portfolio.

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Infrastructure, Mobility, and Urban Networks (4th year, 6 ECTS)

Syllabus:
1. Urban Infrastructure
1.1 Introduction to Infrastructure Planning.
1.2 Planning Methodologies.
1.3 Urban Infrastructure Management.
1.4 Sustainability and Resilience.
2. Urban Mobility
2.1 Concepts of Mobility and Accessibility.
2.2 Characterization of Mobility Supply
2.3 Integrated Planning: Modal Integration and Urban Design Focused on Mobility.
2.4 Environmental and Social Impacts of Urban Mobility
3. Urban Networks
3.1 Definition and Types of Urban Networks.
3.2 Relationship between networks, territory, and city.
3.3 Scales of the urban network: local, regional, and global.- Interrelation between urban scales.

Teaching Methodologies (including assessment):
The course is taught with theoretical classes on the listed subjects, using elements of observation and/or experimental support - theoretical-practical classes dedicated to solving concrete situations. The assessment will include a periodic assessment based on the following elements: territorial analysis work; study of the insertion of mobility infrastructure and a written test.
The assessment method is based on a continuous assessment model and will center on the development of a theoretical-practical project developed in 4 phases according to the respective worksheet. In addition to these elements, the assessment will include a comprehensive exam.

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[3] LeGates, Richard T.; Frederic, Stout. (1996) The City Reader. New York: Ed. dos autores, Routledge.
[4] Special Report Sustainable Urban Mobility in the EU: No substantial improvement is possible without Member States commitment https://www.eca.europa.eu/Lists/ECADocuments/SR20_06/SR_Sustainable_Urban_Mobility_EN.pdf
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