

A - General description

Course Title – Civil Engineering

Qualification awarded – First-cycle degree (BSc degree) (180 ECTS)

Admission requirements – General admission procedures, re-enter and special admission schemes for candidates older than 23. The general admission system requires one of the following exams: Descriptive Geometry, Physics-Chemistry or Mathematics. Regional preferences are applied amounting to 40 % of total admissions.

Educational and Professional goals - Provide the students with up-to-date and diversified training in matters related to civil construction and public works such as project, planning, execution and supervision of construction works. We seek to raise awareness about construction safety, quality, sustainability and environmental aspects.

This degree aims at training professionals with skills and critical sense, capable of understanding civil engineering problems and of being receptive to lifelong learning.

Graduates of this degree can work as designers analysing, designing and detailing works, as executors conducting on-site works and as supervisors ensuring project compliance and the quality of execution.

Access to further studies – The degree in Civil Engineering allows access to second-cycle degrees in the fields of Civil Engineering, and where an engineering degree is established as a prerequisite.

Course structure diagram with credits (60 per year) – Three-year course (six semesters, 30 ECTS credits each):

Course Title	Year	Semester	Number of credits
Mathematical Analysis I	1	1	6
Linear Algebra	1	1	5
Chemistry	1	1	4
Physics	1	1	5
Applied Mechanics	1	1	5
Building Materials I	1	1	5
Mathematical Analysis II	1	2	6
Statistics	1	2	5
Continuum Mechanics	1	2	4
Strength of Materials I	1	2	5
Applied Geology	1	2	5
Building Materials II	1	2	5
Mathematical Analysis III	2	1	5
General Construction Processes I	2	1	5
Strength of Materials II	2	1	5
Hydraulics I	2	1	5
Soil Mechanics I	2	1	5
Technical Drawing	2	1	5
Surveying	2	2	5
General Building Processes II	2	2	5
Structures I	2	2	5
Hydraulics II	2	2	5
Soil Mechanics II	2	2	5
Concrete I	2	2	5
Concrete II	3	1	5
Management and Security	3	1	5
Structures II	3	1	5

Foundations	3	1	5
Building Design and Detailing	3	1	5
Applied Hydraulics I	3	1	5
Road and Traffic Engineering	3	2	5
Steel and Mixed Steel-Concrete Constructions	3	2	4
Buildings Physics	3	2	5
Applied Hydraulics II	3	2	4
Urban and Regional Planning	3	2	5
Project	3	2	7

Final examination, if any – Not applicable

Examination and assessment regulations – final examination not required; examination and assessment defined for each individual course unit

ECTS departmental co-ordinator – Prof. Ana Paula Machado (ana.machado@ipt.pt)

B - Description of individual course units

Course title	Mathematical Analysis I
Course code	90891
Type of course	One-semester course
Level of Course	I
Year of study	First
Semester/trimester	First
Number of credits	6
Name of lecturer	Luís Merca, Manuela Fernandes, Miguel Caceiro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide the basic concepts and mathematical methods commonly used in this engineering degree. Provide the students with skills to work with differential and integral calculus in functions of one real variable.
Prerequisites	NA
Course contents	Preliminaries. Real functions of a real variable. Limits and continuity. Differential calculus. Integral calculus.
Recommended reading	Support texts and material available in the course webpage. Jaime Carvalho e Silva; "Princípios de Análise Matemática Aplicada". Mc Graw-Hill. Swokowski, E. W.; "Cálculo com Geometria Analítica". McGraw-Hill. Piskounov, N.; "Cálculo Diferencial e Integral". Edições Lopes da Silva, Porto. Simmons, G. F.; "Cálculo com Geometria Analítica". McGraw-Hill. Anton, Howard; "Cálculo um novo horizonte. Volume I". Bookman. Stewart, James; "Cálculo. Volume I". Pioneira. Larson, Ron; "Cálculo. Volume I". 8ª Edição. McGraw Hill.
Teaching methods	Lectures involving presentation and illustration of the proposed subjects. Theoretical-practical classes where exercises are proposed and solved.
Assessment methods	Continuous assessment: two written tests. Exam assessment: one written test.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Linear Algebra
Course code	90892
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	First
Number of credits	5
Name of lecturer	João Patrício; Carlos Perquilhas; Pedro Carrasqueira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide insight on Matrix Linear Algebra, placing special emphasis on the discussion and the exact and approximate computation of the solution of linear systems of equations. Furthermore, Vector Spaces, Determinants and Matrix Eigenvectors and Eigenvectors are studied. These are topics of utmost interest in many Engineering applications.
Prerequisites	NA
Course contents	Matrices and systems of linear equations. Vector spaces. Determinants. Eigen values and eigenvectors of square matrices.
Recommended reading	Lecture notes available at the IPT <i>e-learning</i> platform. F. Dias Agudo, Introdução à Álgebra Linear e Geometria Analítica, Escolar Editora, Lisboa, 1978. E. Giraldez, P. Smith, Curso de Álgebra Linear e Geometria Analítica, Mcgraw-Hill, Lisboa, 1995. L. T. Magalhães, Álgebra Linear como Introdução à Matemática Aplicada, Texto Editora, 1989. W. Nicholson, Linear Algebra with Applications, PWS Publishing Company, Boston, 1995. M. Heath, Scientific Computing: an Introductory Survey, McGraw-Hill, 2007. R. Burden e J. Faires, Numerical Analysis, John Wiley & Sons, 1993.
Teaching methods	Theoretical and theoretical-practical lectures, with presentation and illustration of the proposed subjects.
Assessment methods	Continuous assessment: two written tests. Exam assessment: one written test.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Chemistry
Course code	90893
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	First
Number of credits	4
Name of lecturer	José Manuel Quelhas Antunes / Marco António Mourão Cartaxo
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop skills on chemistry fundamentals and the role of Chemistry on sciences in general and in civil engineering in particular. Skill acquisition on chemical laboratory matters.
Prerequisites	NA
Course contents	Basics. The structure of matter. Periodic Table. Chemical reactions. Stoichiometric calculus. Chemical balance. Acids and bases. Low-solubility salts. Oxidation-reduction.
Recommended reading	Lecture notes available at the course webpage. Chang, Química, McGraw Hill, Lisboa (1994)
Teaching methods	Lectures presenting concepts on subject matter and practical classes where laboratory works are carried out and exercises solved.
Assessment methods	Weighted average of the theoretical grade obtained in a written test (periodical or exam assessment) and the practical grade obtained in laboratory reports. Theoretical component: 75% Practical component: 25%
Language of instruction	Portuguese

B - Description of individual course units

Course title	Physics
Course code	90894
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	First
Number of credits	5
Name of lecturer	Rui Gonçalves
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of skills to analyse and solve mechanical problems (kinematics and dynamics) with few ideal bodies.
Prerequisites	Basic knowledge of calculus
Course contents	1 – Vectorial, differential and integral notions. 2 – Measures and units. International Unit System. 3 – Material point kinematics. 4 – Material point dynamics. Force. 5 – Work and Energy. 6 – Rigid Body, Static and Elasticity. 7 – Vibrational movement.
Recommended reading	Raymond A. Serway e John W. Jewett, Jr., <i>Physics for Scientists and Engineers with Modern Physics</i> , Thomson, Brooks/Cole, 6 th ed. (2004) Richard P. Feynman, Robert B. Leighton e Matthew Sands, <i>The Feynman Lectures on Physics</i> , vol. I. Addison-Wesley Publishing Company, 1977 Alonso & Finn, <i>Física - um curso Universitário</i> , vol. I - Mecânica, vol. II - Campos e Ondas, Edgard Blucher
Teaching methods	Theoretical classes teaching concepts, principles and applications of physical laws ruling mechanics. Practical classes proposing and solving applied exercises.
Assessment methods	One individual research work with report and one written test.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Applied mechanics
Course code	90895
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	First
Number of credits	5
Name of lecturer	Cristina Margarida Rodrigues Costa
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of competences for solving applied statics problems as applied to Civil Engineering.
Prerequisites	Basic knowledge of physics, mathematics and linear algebra
Course contents	Introduction to vectorial mechanics. Applied Statics: isostatic structures: loading systems; support conditions; structural systems. Concept and properties of hinges, pistons and slides. Equilibrium of isostatic structures: support reactions, free-body diagrams and internal forces, relationship between applied load and internal forces. Plane trusses: stability and determinacy, resolution at joints, methods to calculate axial forces. Cables. Geometry of masses.
Recommended reading	Beer, F.P., Johnston, R.E. - Mecânica Vectorial para Engenheiros, McGraw Hill; Gorfin, B., Oliveira, Myriam Marques - Estruturas Isostáticas, Livros Técnicos e Científicos, Rio de Janeiro; Campanari, Flávio A. - Teoria das Estruturas, Vol I e II, Ed. Guanabara Dois; Fonseca, Adhemar - Curso de Mecânica, Vol II, Livros Técnicos e Científicos; Decreto-lei nº235/83, de 31 de Maio
Teaching methods	Statics fundamentals are explained through the introduction of theoretical concepts and practical methodologies for current Civil Engineering applications. Analysis and discussion of case studies to allow critical intervention of the student. Execution of practical exercises to consolidate knowledge acquired.
Assessment methods	One final written exam during regular assessment period, and practical exercises proposed on class.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Building Materials I
Course code	90896
Type of course	One-semester course
Level of Course	I
Year of study	First
Semester/trimester	First
Number of credits	5
Name of lecturer	Anabela Mendes Moreira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This subject is an introduction to material science. The students should have a basic understanding of physical properties, processes of extraction/transformation/production, the main applications, the laboratorial procedures and the technical documents for the quality control of usual construction materials. The impact of materials on environmental degradation is also dealt with.
Prerequisites	NA
Course contents	1 – Introduction to building materials; 2 – Natural stones; 3 – Earth as building material; 4 – Mineral binders; 5 – Ceramics; 6 – Glass; 7 – Wood; 8 – Steel and non-ferrous metals; 9 – Polymeric materials (paints, varnishes, plastics and bituminous materials); 10 – Composite materials.
Recommended reading	Texts available at the website: Bauer, F., “Materiais de Construção”, Livros Técnicos e Científicos, 4 ^a Ed., Rio de Janeiro Smith, R. C., “Construction Materials”, Mac Graw Hill.
Teaching methods	Lectures with illustrative examples (2 hours/week); practical (2 hours/week) and tutorials (1hour/week) dedicated to solving problems suggested by the lecturer.
Assessment methods	Written report, oral presentation and written examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Mathematical Analysis II
Course code	90897
Type of course	One-semester course
Level of Course	II
Year of study	First
Semester/trimester	Second
Number of credits	6
Name of lecturer	Carlos Perquilhas, Luís Merca, Miguel Caceiro, Pedro Carrasqueira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide the basic concepts and mathematical methods usually used in this engineering degree. Provide students with skills to work with differential and integral calculus in functions of several real variables.
Prerequisites	NA
Course contents	Numerical and Functions Series. Real functions of several real variables. Multiple Integrals.
Recommended reading	Support texts and material available in the course webpage. Jaime Carvalho e Silva; "Princípios de Análise Matemática Aplicada". McGraw-Hill. Swokowski, E. W.; "Cálculo com Geometria Analítica". McGraw-Hill. Piskounov, N.; "Cálculo Diferencial e Integral". Ed. Lopes da Silva. Simmons, G. F.; "Cálculo com Geometria Analítica". McGraw-Hill. Anton, Howard; "Cálculo um novo horizonte. Volume II". Bookman. Stewart, James; "Cálculo. Volume II". Pioneira. Larson, Ron; "Cálculo. Volume II". 8ª Edição. McGraw Hill. Zill D., Cullen M.; "Advanced Engineering Mathematics". PWS Azenha A., Jerónimo M., "Cálculo Diferencial e Integral em \mathbb{R} e \mathbb{R}^n ". McGraw-Hill.
Teaching methods	Theoretical lectures with presentation and illustration of the proposed subjects. Theoretical-practical lectures proposing and solving exercises.
Assessment methods	Continuous assessment: two written tests. Exam assessment: one written test.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Statistics
Course code	90898
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	Second
Number of credits	5
Name of lecturer	Luís Miguel Grilo
Objectives of the course (preferably expressed in terms of learning outcomes competences)	To provide students with the foundations of some of the main techniques and methodologies of Statistics, so that they develop analysis and reasoning skills that allow them to design and implement solutions to various problems. The aim of this course is to provide tools that facilitate decision-making.
Prerequisites	Knowledge of Mathematical Analysis and Linear Algebra.
Course contents	<ul style="list-style-type: none"> 1 - Elements of probability. 2 - Random variables. Some probability distributions. 3 - Sampling and sample distributions. 4 - Estimation of parameters. 5 - Tests of hypotheses. 6 - Correlation and simple linear regression.
Recommended reading	<p>Support texts and material available in the course website:</p> <p>Some literature:</p> <p>Guimarães, Rui C. e Cabral, José A. S. (2007). <i>Estatística</i>. 2.^a Edição, McGraw-Hill.</p> <p>Pedrosa, A. C. e Gama, S. M. A. (2004). <i>Introdução Computacional à Probabilidade e Estatística</i>. Porto Editora.</p>
Teaching methods	Theoretical classes with description and illustration of the concepts and methods taught. Theoretical-practical classes with problem solving. Tutorials where students have the opportunity to use software for the processing of statistical data.
Assessment methods	Written assessment (continuous assessment: two periodic tests; assessment exam: regular period and re-taking).
Language of instruction	Portuguese

B - Description of individual course units

Course title	Continuum Mechanics
Course code	90899
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	Second
Number of credits	4
Name of lecturer	Luís Carlos Prola
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide theoretical and practical knowledge of solid and fluid mechanics that will be useful in other Civil Engineering fields.
Prerequisites	Basic knowledge of kinematics, linear algebra and differential and integral calculus.
Course contents	1 - Introduction 2 - Cartesian tensor concept and properties 3 - Stress analysis 4 - Strain analysis. Flow analysis. 5 - Constitutive laws for solid body and fluids 6 - Conservation laws 7 - Energy of deformation 8 - Strength criteria applied to the most used materials in Structural Engineering
Recommended reading	Branco, C.A.G.M. – Mecânica e Resistência dos Materiais, Fundação Calouste Gulbenkian, Lisboa, 1995 Oliveira, E.R.A. – Elementos da Teoria da Elasticidade, IST Press, Lisboa, 1999 Mase, G. E. – Continuum Mechanics, Shaum's Outlines, McGraw-Hill, 1970.
Teaching methods	Theoretical classes using computer resources and development of illustrative exercises in the practical classes.
Assessment methods	Theoretical and practical exams.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Strength of Materials I
Course code	908910
Type of course	One-semester course
Level of Course	I
Year of study	First
Semester/trimester	Second
Number of credits	5
Name of lecturer	José António Dias Nogueira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Acquire the basic skills on Strength of Materials that allow the perception and calculation of stresses and strains with origin in the axial effort.
Prerequisites	NA
Course contents	1 - Strength of materials basic concepts. 2 - Stresses and strains. Structural safety concepts. 3 - Elementary elasticity of beams and columns. 4 - Design of elements with axial load. 5 - Elastoplastic analysis. 6 - Prestress concepts. 7 - Temperature effects. 8 - Composite sections and materials. 9 - Stability of columns. Euler critical loads. 10 - Safety provisions on compressed members.
Recommended reading	SILVA, V. Dias da - Mecânica e Resistência dos Materiais, 2ª Edição, Zuari, 1995 FARINHA, J. S. Brazão; REIS, A. Correia dos – Tabelas Técnicas, Edições Técnicas E.T.L., Lda; 1996
Teaching methods	Theoretical classes exploring concepts and practical classes with knowledge application and exercise solving.
Assessment methods	Evaluation test and assignment.
Language of instruction	Portuguese.

B - Description of individual course units

Course title	Applied Geology
Course code	908911
Type of course	One-semester course
Level of Course	NA
Year of study	First
Semester/trimester	Second
Number of credits	5
Name of lecturer	Carla Correia
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of skills to distinguish minerals, rocks, geologic structures and their mechanic behaviour, their application and consequences in civil engineering. Interpretation of geological maps and geological profiles.
Prerequisites	Concepts of nature sciences and chemistry.
Course contents	1 - Structure and composition of Earth. 2 - Internal geodynamics. 3 - Material types, scalar and directional properties and chemical unions. 4 - Crystallography and crystallochemistry. 5 - Study of minerals, laboratorial identification. 6 - Study of rocks, laboratorial identification. 7 - Geologic structures. 8 - Study and geotechnical classification of rock masses. 9 - Geological maps and geological profiles. 10 – Portuguese geology.
Recommended reading	Plummer, Charles C.; McGeary, David e CARLSON, Diane H, <i>Physical Geology</i> , Mc Graw Hill (2003). Costa, Joaquim Botelho, <i>Estudo e Classificação das Rochas por Exame Macroscópico</i> , Fundação Calouste Gulbenkian (1998).
Teaching methods	Theoretical classes with concept explanation and laboratorial practical classes with macroscopic identification of minerals and rocks. Execution of geological profiles.
Assessment methods	Written examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Building Materials II
Course code	908912
Type of course	One-semester course
Level of Course	II
Year of study	First
Semester/trimester	Second
Number of credits	5
Name of lecturer	Fernando Dias Martins
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop skills to solve problems on the composition of mortars and concretes and to carry out testing on fresh and hardened concrete.
Prerequisites	Basics of units and materials properties taught in Building Materials I.
Course contents	Aggregates, binders, mortars and concretes. Binder fabrication procedures. Determination of the properties of aggregates and binders. Study of the composition of mortars and concretes.
Recommended reading	NP – EN 12620 Agregados para Betão NP – EN206 – 1 Betão Euronormas relacionadas com os ensaios atrás referidos; Reg. de Estruturas de Betão Armado e Pré-esforçado; COUTINHO, A. S., Fabrico e propriedades do betão, LNEC; MONTROYA, J., Hormigon Armado, Editorial Gustavo Gil; BAUER, L.A. Falcão, Mat. de Construção, Livraria Esc. Editora.
Teaching methods	Lectures focusing on the procedures for the various tests and study methods concerning the composition of concretes. Practical classes include laboratory work (+/- 75%) and exercise solving (+/- 25%).
Assessment methods	Written test without consultation material and reports on practical work. Periodical tests or two exam periods.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Mathematical Analysis III
Course code	908913
Type of course	One-semester course
Level of Course	III
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	Pedro Miguel Carrasqueira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide the student with the ability to evaluate surface areas, volumes and curve integrals, solve differential equations and apply numerical methods to solve equations, polynomial interpolation and integration, and finally, to solve initial value problems.
Prerequisites	Basic knowledge of mathematical derivation and integration with one or more variables
Course contents	1 - Curve Integrals 2 - Surface Integrals 3 - Differential equations 4 - Numerical methods to solve non linear equations 5 - Polynomial Interpolation 6 - Numerical Integration 7- Numerical methods to solve initial value problems
Recommended reading	Anton, Howard; "Cálculo um novo horizonte. Volume II" Bookman Zill, Dennis G.; "A first course in differential equations". Brooks/Cole. R Burden e J. Faires. "Numerical Analysis". PWS Publishing Company, 1993. H. Pina. "Métodos Numéricos". McGraw-Hill de Portugal, 1995.
Teaching methods	Theoretical classes involving provision of theoretical foundations and illustrative examples. Theoretical/practical classes involving exercise solving.
Assessment methods	Written exam
Language of instruction	Portuguese

B - Description of individual course units

Course title	General Construction Processes I
Course code	908914
Type of course	One-semester course
Level of Course	I
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	Fernando Dias Martins
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide knowledge on civil construction proceedings including techniques, function of the materials, methods of execution and equipment used. The various processes are systematized and described indicating the advantages and disadvantages of each one. .
Prerequisites	NA
Course contents	Construction stages; preliminary works; site installation; excavation; planking and peripheral containment; direct and indirect foundations; common formwork; reinforced concrete structures both metallic and pre-fabricated; vertical joints; expanding joints; glass façades; urban street layout; special structures.
Recommended reading	Coleção - Sistemas de Construção I, II, III, IV, V, VI, VII e VIII – Jorge Mascarenhas, Livros Horizonte Tratado de Construction, H. Schmitt, G.G. Tratado de Edification, Frick Knoll, Newman, G.G. Pratique de la Construction des Batiments, Mittag, Eyrolle
Teaching methods	Theoretical classes focusing on the basic construction materials, products and processes. Theoretical-practical classes with presentation of workmanship cases.
Assessment methods	Written test and practical work (technical report describing work monitoring and project execution)
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Strength of Materials II
Course code	908915
Type of course	One-semester course
Level of Course	II
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	José António Dias Nogueira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Acquisition of basic skills on Strength of Materials that allow the perception and calculation of flexural stresses and strains.
Prerequisites	NA
Course contents	1 - Flexural and shear stresses and strains. 2 - Analysis of flexural and shear effects. 3 - Non-linear flexural analysis. 4 - Deflection of beams. 5 - Torsion. 6 - Strain energy. 7 - Lateral instability of beams.
Recommended reading	SILVA, V. Dias da – Mecânica e Resistência dos Materiais, 2 ^a Edição, Zuari, 1995 FARINHA, J. S. Brazão; REIS, A. Correia dos – Tabelas Técnicas, Edições Técnicas E.T.L., Lda; 1996
Teaching methods	Theoretical classes presenting concepts and foundations and practical classes of application and exercise solving.
Assessment methods	One test and one assignment.
Language of instruction	Portuguese.

	B - Description of individual course units
Course title	Hydraulics I
Course code	908916
Type of course	One-semester course
Level of Course	I
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	Carla Correia
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop basic skills on hydraulics that will allow the students to solve practical problems such as the calculus of flow rates, head loss, hydraulic power and others.
Prerequisites	General concepts of physics
Course contents	1 - Fluid properties 2 - Hydrostatics 3 - Dimensional analysis 4 - Similarity theory 5 - Hydrokinematics 6 - Concepts and fundamentals of hydrodynamics 7 - Global study fluid flow 8 - Momentum equations 9 - Head loss flow laws 10 - Steady flow in pipe networks
Recommended reading	Quintela, A. C., <i>Hidráulica</i> , 7ª ed., Fundação Calouste Gulbenkian (2000). White, F. M., <i>Fluid Mechanics</i> , 4ª ed., McGraw-Hill (1999).
Teaching methods	Lectures focusing on the theoretical content of the course and practical classes involving concept application and exercise solving.
Assessment methods	Practical assignment + periodical written test or final examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Soil Mechanics I
Course code	908917
Type of course	One-semester course
Level of Course	I
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	Ana Paula Gerardo Machado
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to develop expertise on soil mechanics in particular origins and types of soil deposit, physical and index properties, classification of engineering soils, compaction and performance control, test standardization, calculation of on-site soil stress and stress due to surface loads and her effects on soil masses, water in soil masses: permeability, capillarity and seepage.
Prerequisites	Concepts of Physics, Mathematics and Geology.
Course contents	Introduction to Soil Mechanics: origin and types of soil deposit, properties of engineering soils, classification. Standards for testing and interpretation methods. Soil compaction: standards; effects on soil properties; field compaction and control. Stress and deformation in soil mass: stress due to self-weight; stress due to applied loads; settlements based on elastic theory. Seepage theory and groundwater flow. Laboratorial and on-site tests. Exercises.
Recommended reading	Fernandes, M.M., <u>Mecânica dos Solos, vols I</u> , FEUP 2006; Berry, P.L.; Reid, D., <u>An Introduction to Soil Mechanics</u> .UK 1987; LNEC – <u>Normas Portuguesas para a Realização de Ensaios</u> ; Correia, António Gomes – <u>Ensaios para Controlo de Terraplenagens</u> . LNEC, 1987
Teaching methods	Theoretical and interactive classes. Examples of practical construction works with exercise solving. Laboratory testing.
Assessment methods	Continuous assessment: practical assignment and written tests with theoretical and practical components. Written exam including theoretical and practical components.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Technical Drawing
Course code	908918
Type of course	Semester
Level of Course	NA
Year of study	Second
Semester/trimester	First
Number of credits	5
Name of lecturer	Inês Serrano
Objectives of the course (preferably expressed in terms of learning outcomes competences)	To develop skills of analysis and comprehension in order to understand and represent with accuracy any object, even complex ones, while respecting drawing rules.
Prerequisites	Basic notions of geometry
Course contents	1-Drawing design rules 2-Orthogonal views 3-Rapid views (isometric, diametric and cavalier) 4-Slices and sections 5-Design and scales 6-Drawing sheets and their graphical elements 7-Computer aided drawing (CAD) 8-CAD, two dimensional drawings 9-CAD, graphical elements and design 10-CAD, tree dimensional drawings
Recommended reading	Desenho Técnico, Luís Veiga da Cunha, Fundação Calouste Gulbenkian AutoCAD 2008, José Garcia, Autodesk, FCA
Teaching methods	Teaching is based on direct and continuous learning, assignment and problem solving practical exercises.
Assessment methods	Assessment based on examinations, coursework and problem-based exercises within real-life scenarios.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Surveying
Course code	908919
Type of course	One-semester course
Level of Course	NA
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	Fernando Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students will develop skills to monitor and supervise professional surveying tasks in civil construction and to install construction works.
Prerequisites	Basics of mathematics with particular emphasis to trigonometry.
Course contents	1 – Surveying fundamentals 2 – The theodolite. Distance measurement. 3 – General methods of surveying 4 – Topographical levelling 5 – Setting out 6 – Calculus of volume of earth
Recommended reading	Tratado general de topografia , Edit. Gustavo Gili S. A. Barcelona Topografia geral, Ed. Técnica - Xerez Topografia - Francisco Valdés Doménech - Colecção Construções e Móveis Sebenta de topografia FCTUC
Teaching methods	Lectures; practical classes involving problem solving and field classes involving contact with surveying and survey equipment.
Assessment methods	Periodical written test or final written examination. Practical assignments: 25% of final evaluation.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	General Construction Processes II
Course code	908920
Type of course	One-semester course
Level of Course	II
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	Maria de Lurdes Belgas da Costa Reis
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Acquisition of knowledge in the domain, the technologies and the processes of construction, basic elements such as walls, floors and coverings of buildings, as well as the characteristics and properties of the materials used. The students should be aware that functional performance of the construction elements depends upon the compliance between the materials used and the technical solution adopted and gain appropriate skills to select the right technical solution.
Prerequisites	NA
Course contents	Construction of masonry and concrete walls; walls cladding; pavement cladding; roof coverings; moisture in construction; walls and roof coverings anomalies. Some concepts of regulations for public works.
Recommended reading	<p>Texts and material available in the course website:</p> <p>Associação Portuguesa da Indústria da Cerâmica (2000), Manual de Alvenaria de Tijolo, Coimbra.</p> <p>Associação Portuguesa da Indústria da Cerâmica (1998), Manual de Aplicação de Telhas Cerâmicas, Coimbra.</p> <p>Associação Portuguesa da Indústria da Cerâmica (2003), Manual de Aplicação de Revestimentos Cerâmicos, Coimbra.</p>
Teaching methods	Theoretical classes focusing on basic construction materials and processes. Theoretical-practical classes including case studies.
Assessment methods	Written test and practical work (technical report describing work monitoring and project execution).
Language of instruction	Portuguese

B - Description of individual course units

Course title	Structures I
Course code	908921
Type of course	One-semester course
Level of Course	I
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	Carlos Jorge Trindade Silva Rente
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Formulation and application of methods of analysis of statically undetermined structures in linear elasticity. Raising awareness of the factors contributing to structural behaviour in the structural design context.
Prerequisites	Basic concepts of Statics and Strength of Materials.
Course contents	General principles of static equilibrium of solids and structures. Introduction to structural analysis. Virtual work theorem. Introduction to the Force Method. Energy Methods. Introduction to the Displacement Method. Cross relaxation Method. Introduction to the influence lines theory.
Recommended reading	<p>A. Ghali and A. M. Neville. <i>Structural Analysis. A unified classical and matrix approach</i>. E & FN Spon, 4th edition, 1997.</p> <p>J. A. Teixeira de Freitas. <i>Análise de estruturas I</i>. IST, 1986.</p> <p>Raimundo Delgado. <i>Teoria de Estruturas. Acetatos de apoio às aulas teóricas</i>. FEUP, 2003.(website da disciplina)</p> <p>R. C. Hibbeler. <i>Structural Analysis</i>. Prentice Hall, 5th ed., 2001.</p>
Teaching methods	Theoretical classes on the fundamental aspects related to the main topics of the course. Practical resolution of exercises oriented to promote critical sense and participation of students in the class topics.
Assessment methods	Continuous evaluation on the subject matters through the resolution of exercises or mini-tests. Final grade is the mark obtained in the periodical written examination or in the final written examination.
Language of instruction	Portuguese.

B - Description of individual course units

Course title	Hydraulics II
Course code	908922
Type of course	One-semester course
Level of Course	II
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	António Cavalheiro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of skills to solve general hydraulic problems, such as pipe and open channel calculus, water hammer study, flow measurements and fluid machinery calculus.
Prerequisites	Hydraulics I concepts.
Course contents	1 - Water hammer analysis. 2 - Open-channel flow 3 - Pipe orifice. 4 - Elementary theory of notches and weirs 5 - Flow measurements. 6 - Fluid machinery.
Recommended reading	Quintela, A. C., <i>Hidráulica</i> , 7ª ed., Fundação Calouste Gulbenkian (2000). Lencastre, A., <i>Hidráulica Geral</i> (1996).
Teaching methods	Lectures involving presentation and illustration of the proposed topics. Theoretical-practical classes involving practice and problem solving.
Assessment methods	Practical assignment and periodical written test or final examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Soil Mechanics II
Course code	908923
Type of course	One-semester course
Level of Course	II
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	Ana Paula Gerardo Machado
Objectives of the course (preferably expressed in terms of learning outcomes competences)	This course aims to develop expertise on soil mechanics in particular as regards to the calculation of stress and strain, compressibility settlement, shear strength, stability of slopes, lateral earth pressure and implementation of solutions for improving soil properties. In order to achieve this goal, surveying and testing skills are required: selection of methods and procedures for ground investigation and appropriate tests for the measurement of parameters to be adopted in the project and work monitoring.
Prerequisites	Concepts of physics, mathematics, chemistry and geology.
Course contents	Consolidation theory and settlement analysis: radial consolidation theory and preloading. Shear strength theory. Lateral earth pressure. Stability of slopes. Ground investigation and methods of ground improvement. Examples of geotechnical works. Site improvement. Exercises. Laboratorial tests.
Recommended reading	<p>Fernandes, M.M. – <u>Mecânica dos Solos</u> (vols I e II), FEUP 2006.</p> <p>Cernica, J.N. – <u>Geotechnical Engineering: Soil Mechanics</u>, USA 1995.</p> <p>Berry, P.L.; Reid, D. - <u>An Introduction to Soil Mechanics</u>, UK 1987.</p> <p>Terzaghi, K.; Peck, R.B. - <u>Soil Mechanics in Engeneering Practice</u>, USA 1967.</p>
Teaching methods	Theoretical and interactive classes of the fundamental aspects related to the main course topics. Illustrative examples of practical construction works. Solving exercises. Laboratory testing.
Assessment methods	Continuous assessment: practical work and written tests with theoretical and practical components. Final written exam including theoretical and practical components.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Concrete I
Course code	908924
Type of course	One-semester course
Level of Course	I
Year of study	Second
Semester/trimester	Second
Number of credits	5
Name of lecturer	Luís Filipe Rocha de Almeida
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should acquire skills that enable them to design and ensure the safety of concrete structures. Ultimate limit state of simple, composite and deflected bending. Shearing and torsional stress ultimate limit state. Constructive procedures and detailing of beam reinforcement. Safety check of limit states. Stress analysis and cracking control. Safety check of ultimate limit state of pillar bending. Provisions for the construction of pillars and walls.
Prerequisites	Solid knowledge of Applied Statics. Good foundations of Strength of Materials.
Course contents	Constitutive materials of reinforced concrete. General safety procedures and criteria. Safety check of strength ultimate limit state. Safety check of bend ultimate limit state. General provisions for reinforced beams. Reinforced concrete structures composed of continuous beams and portal frames.
Recommended reading	Dec.Lei nº 349-C/83, de 30 de Julho ONS-LNEC – <u>Eurocódigos 1 e 2</u> ; Leonhardt, F.;Mönnig,E. – <u>Construções de Concreto, Vol. I, II e III</u> ; Guerrin,A. – <u>Concreto Armado</u> , Hemus Ed. Ltd Montoya, P. J.;Meseguer, A.G.;Cabré,F.M. – <u>Hormigón Armado</u> , Ed. Gustavo Gili, S.A., 1987; IST – <u>Apontamentos de Dimensionamento e Pormenorização de Lajes</u> , 1989
Teaching methods	Lectures focusing on theoretical concepts and presenting illustrative examples of the behaviour of reinforced concrete structures and practical classes where exercises are proposed and solved as an application of theoretical concepts.
Assessment methods	Assignments and one “open book” test as periodical assessment or final examination in the regular exam periods.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Concrete II
Course code	908925
Type of course	One-semester course
Level of Course	II
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	Luís Filipe Rocha de Almeida
Objectives of the course (preferably expressed in terms of learning outcomes competences)	The students should develop skills that enable them to design concrete structures as regards three major areas: Slabs and reinforced concrete foundations: design and reinforced beam detailing; Safety check of ultimate limit states for reinforced and pre-stressed concrete structure; The concept of pre-stress and its impact on structures: design and detailing.
Prerequisites	Knowledge of Applied Statics and basics of Strength of Materials.
Course contents	Slabs; Foundations; Wall beams and short cantilever beams; Retaining walls; Provisions concerning improved ductility structures; Usage limit states; Reinforced and pre-stressed concrete
Recommended reading	Dec.Lei nº 349-C/83. De 30 de Julho – REBAP ONS-LNEC – <u>Eurocódigos 1 e 2</u> LEONHARDT,F.;MÖNNIG,E.–Construções de Concreto,Vol. I, II e III GUERRIN,A. – Concreto Armado, Hemus Ed. Ltd MONTROYA, P. J.;MESEGUER, A.G.;CABRÉ,F.M. – Hormigón Armado, Ed. Gustavo Gili, S.A., 1987 IST – Apontamentos de Dimensio. e Porme. de Lajes, 1989
Teaching methods	Lectures focusing on theoretical concepts and presenting illustrative examples of the behaviour of reinforced concrete structures and practical classes where exercises are proposed and solved as an application of theoretical concepts.
Assessment methods	Assignments and one “open book” test as periodical assessment or final examination in the regular exam periods.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Management and Safety
Course code	908926
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	Anabela Mendes Moreira
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide knowledge in the construction management and safety construction domains with special emphasis to the procedures during design and execution, cost planning and control. Rules and procedures that provide execution of construction works under safety conditions are also studied.
Prerequisites	Technical Drawing, Building Materials I and II, General Construction Processes I and II.
Course contents	Measurement procedures and rules for design and execution. Management of time, resources and costs. Cost planning and control. Definition and allocation of materials, equipment, and manpower resources. Review cost methods. Health and safety at work. Collective protection and personal protection. Noise and vibrations in the workplace. Prevention tools. Construction safety planning.
Recommended reading	Texts at the web site; CARDOSO, José de Almeida Mota; Direcção de obra: organização e controlo / J. M. Mota Cardoso – Lisboa, Biblioteca AECOPS, 1985; FONSECA, M. Santos; “Curso sobre Regras de Medição na Construção”; 1999; - Plano de Segurança e Saúde na Construção – IDICT.
Teaching methods	Lectures with presentation of illustrative examples (2 hours/week); practical (2 hours/week) and tutorial classes (1hour/week) dedicated to solving problems suggested by the lecturer.
Assessment methods	Coursework, oral presentation and written examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Structures II
Course code	908927
Type of course	One-semester course
Level of Course	II
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	Carlos Jorge Trindade Silva Rente
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Provide the principles, theories and models for analyzing structural systems of static and dynamic loads. Transmission of forces based upon vertical or horizontal load systems in buildings. Building bracing aspects. Simplified methods for structural building analysis of vertical and horizontal loads. Structural computational analysis and design based upon two and three-dimensional commercial codes, giving a realistic overview of the structural design and safety world.
Prerequisites	Basic concepts of Statics, Dynamics and Strength of Materials.
Course contents	Fundamentals of structural idealization. Structural safety and design. Vertical actions on structures. Horizontal actions on structures: Bracing systems; Wind design; Earthquake design. Structural computational analysis and design. Introduction to the finite element method.
Recommended reading	Figueiras, J. – Estruturas de Edifícios. Aparentamentos. FEUP Curso sobre Nova Regulamentação de Estruturas. FEUP Regulamento de Segurança e Acções para Estruturas de Edifícios e Pontes Eurocódigo 1. LNEC
Teaching methods	Theoretical classes on the fundamental aspects related to the main topics of the course. Practical resolution of exercises oriented to promote critical sense and participation of students in the class topics.
Assessment methods	Continuous evaluation on the subject matters through the resolution of exercises or mini-tests. Final grade is the mark obtained in the periodical written examination or in the final written examination.
Language of instruction	Portuguese.

	B - Description of individual course units
Course title	Foundations
Course code	908928
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	Fernando Manuel Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop skills that enable the students to execute foundation calculi.
Prerequisites	Basics of Geology, Soil Mechanics and Strength of Materials
Course contents	<p>1 – Partial and global safety rates. Formulation.</p> <p>2- Surface foundations: types, load capacity and settlement.</p> <p>3- Deep foundations: types, load capacity and settlement. Foundation pile group.</p> <p>4 – Support structure and digging: lagging, support structure types and stability check.</p>
Recommended reading	<p>BOWLES , Joseph E. - Foundation analisys and design</p> <p>PECK, Hanson, Thornburn – Foundation engineering</p> <p>TERZAGHI, Peck – Mecânica de solos na engenharia prática</p> <p>FOLQUE, José – Lnc - Fundações – Recomendações gerais</p> <p>TOMLINSON, M. J. - Foundation design and construction</p> <p>GUÉRRIN, Vol 2 – Concreto armado – Fundações</p> <p>COELHO, SILVÉRIO – Tecnologia de Fundações</p>
Teaching methods	Lectures; practical classes with problem solving; multimedia presentations and on-site visits related to geotechnical fields.
Assessment methods	Periodical written test or a final exam.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Building Design and Detailing
Course code	908929
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	Jorge Mascarenhas
Objectives of the course (preferably expressed in terms of learning outcomes competences)	To develop students' skills of analysis and comprehension in order to understand and design with accuracy all drawings of buildings and correct any irregularities.
Prerequisites	Basic notions of technical drawing and CAD
Course contents	Project organization and planning (introduction). Graphic layout of a building. Surveying techniques. Dimensioning of drawn items. General Regulations for Urban Buildings (<i>RGEU</i>). Pencil-drawn plans and cross sections. CAD – plan and cross-section drawing. Constructive detailing: layout rules. Constructive detailing: consistency and sequence of execution. Constructive detailing: detail layout.
Recommended reading	Desenho Técnico, Luís Veiga da Cunha, Fundação Calouste Gulbenkian Arte de Projectar em Arquitectura, Ernest Newfert Desenho Y Técnica de la Representation en Arquitectura, Prezel, G.G. Regras para a Elaboração de Projectos, LNEC Tratado de Construction, H. Schmitt, GG Sistemas de Construção, Vol. I, Jorge Mascarenhas, Livros Horizonte
Teaching methods	Interactive classes, assignments and exercise solving.
Assessment methods	Assessment is based on examinations, coursework and problem-based exercises taught in real-life scenarios.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Applied Hydraulics I
Course code	908930
Type of course	One-semester course
Level of Course	I
Year of study	Third
Semester/trimester	First
Number of credits	5
Name of lecturer	António Cavalheiro
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of skills to design water and wastewater engineering public systems.
Prerequisites	Hydraulics I and II concepts.
Course contents	1 - Population and its evolution. Flow computation. 2 - Collection of subsoil and surface water. 3 - Mains supply pipelines. Water tanks. 5 - Water pipe network. 6 - Rainwater and domestic wastewater drainage systems; structural design and drain implantation. 7 - Introduction to household water and domestic wastewater treatment systems.
Recommended reading	Regulamento Geral de Distribuição de Água e de Drenagem de Águas Residuais. Direcção Geral dos Recursos Hídricos, <i>Manual de Saneamento Básico</i> .
Teaching methods	Lectures involving presentation and illustration of the proposed topics. Theoretical-practical classes involving practice and problem solving.
Assessment methods	Practical assignment and periodical written test or final examination.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Road and Traffic Engineering
Course code	908931
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	Second
Number of credits	5
Name of lecturer	Fernando Manuel Antunes
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Develop skills that enable the students to project and supervise road works.
Prerequisites	Concepts of Geology, Soil Mechanics and Surveying.
Course contents	<p>1 – Road project fundamentals.</p> <p>2 – Road layout</p> <p>3 – Road geotechnics</p> <p>4 – Earth-moving</p> <p>5 – Road drainage</p> <p>6 – Paving</p>
Recommended reading	<p>-JAE (Junta Autónoma das Estradas): “Normas de Traçado”; JAE, Almada, 1v, 1994.</p> <p>-BRANCO, F.; PICADO - SANTOS, L.; CAPITÃO, S. D.: “Vias de Comunicação: volume 2”, Departamento de Engenharia Civil, F.C.T., Universidade de Coimbra, edição de 1998, 1v.</p> <p>-JAE (Junta Autónoma das Estradas): “Manual de Concepção de Pavimentos para a Rede Rodoviária Nacional”. JAE, Almada, 1v, 1995.</p>
Teaching methods	Lectures; practical classes involving problem-solving, multimedia presentations and on-site visits related to road engineering.
Assessment methods	Periodical written test or a final exam; practical assignments: 25% of final grading.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Steel and Mixed-Steel Concrete Construction
Course code	908932
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	Second semester
Number of credits	4.0
Name of lecturer	Luís Carlos Prola
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Study of mechanical properties of steel, structural behaviour of steel structures, in particular plasticity and stability phenomena and how the building structural systems work. Application of Eurocode 3 specifications for the design of steel structures.
Prerequisites	Concepts of Theory of the Structures and Strength of Materials.
Course contents	1 - Introduction 2 - Structural design fundamentals. 3 - Classification of the sections according EC3. 4 - Steel structural elements. 5 - Steel frames. 6 - Connections. 7 - Design of industrial frames. 8 - Introduction of mixed steel-concrete structures. 9 - Design of mixed slabs.
Recommended reading	Eurocode 3: <i>Design on Steel Structures, Part 1-1: General rules and rules for buildings, prEN-1993-1-1, Stage 49 draft</i> , European Committee for Standardization, Brussel, 2003. Simões, R. <i>Manual de Dimensionamento de Estruturas Metálicas</i> . Eurocódigo 3: Projecto de Estruturas Metálicas, Parte 1-1: Regras gerais e regras para edifícios, Cmm Press, 2005.
Teaching methods	Theoretical classes using computational resources and development of illustrative exercises in the practical classes
Assessment methods	Practical work and exams.
Language of instruction	Portuguese

B - Description of individual course units

Course title	Building Physics
Course code	908933
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	Second
Number of credits	5
Name of lecturer	Maria de Lurdes Belgas da Costa Reis
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of abilities for the execution and compliance check of buildings projects in accordance with applicable legislation in what concerns fire safety, thermal conditions and acoustics.
Prerequisites	Basic knowledge of Physics and Mathematics
Course contents	Functional requirements of construction. Thermal science: general concepts and application of the Building Energy Regulation. Natural ventilation in buildings. Natural ventilation and comfort. Grounds for natural ventilation. Recommendations and devices for natural ventilation. Acoustics: general concepts and application of the Noise Regulation Law and the Noise Pollution Regulation Law. Thermal and acoustic behaviour of buildings and characterization of the corresponding constructive solutions. Fire protection: general concepts and application of the Fire Protection Regulation.
Recommended reading	Support texts and material available in the course webpage. 1. Decreto-Lei n.º 80/2006, de 4 de Abril (RCCTE) 2. Decreto-Lei n.º 40/90, de 6 de Fevereiro (RSCIEH) e actualizações 3. Decreto-Lei n.º 292/2000, de 14 de Novembro (RGR) e legislação complementar
Teaching methods	Theoretical classes involving concept presentation. Practical classes involving problem solving and analysis of compliance of projects with applicable legislation.
Assessment methods	Written test and practical work
Language of instruction	Portuguese

B - Description of individual course units

Course title	Applied Hydraulics II
Course code	908934
Type of course	One-semester course
Level of Course	II
Year of study	Third
Semester/trimester	Second
Number of credits	4
Name of lecturer	António Cavalheiro e Carla Correia
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Development of skills to solve hydrology problems and design of water and wastewater engineering building systems.
Prerequisites	Hydraulics I and II concepts.
Course contents	1 - Distribution systems classification. 2 - Water distribution building systems. 3 - Hot water production and distribution systems. 4 - Sewerage and pluvial drainage building systems. 5 - The hydrologic cycle and Hydrological basin. 6 – Rainfall. 7 - Surface interception and uptake. Infiltration. 8 - Evaporation and total loss 9 - Surface runoff. Rainfall-runoff models. 10 - Erosion and sedimentation.
Recommended reading	Pedroso, Vítor M.R – “Manual dos Sistemas Prediais de Distribuição e Drenagem de Águas”, Laboratório Nacional de Engenharia Civil. Regulamento Geral dos Sistemas Públicos e Prediais de Distribuição de Água e de Drenagem de Águas Residuais. A. Lencastre; F. M. Franco, <i>Lições de Hidrologia</i> ; Universidade Nova de Lisboa, Faculdade de Ciência e Tecnologia (1984).
Teaching methods	Theoretical classes with presentation of concepts and practical classes with problem analysis and resolution.
Assessment methods	Practical works and written examination
Language of instruction	Portuguese

B - Description of individual course units

Course title	Urban and Regional Planning
Course code	908935
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	Second
Number of credits	5
Name of lecturer	Inês Serrano
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Learn key concepts and terminology related to land management and urban planning. Understand the different land plans levels and compare them with the legal framework. Students should be able to diagnose and analyse a number of problems on urban planning policies and apply urban planning concepts and legal instruments.
Prerequisites	NA
Course contents	<ul style="list-style-type: none"> 1 – Land planning 2 - The city and the urbanization processes 3 – Land planning and management 4 - Instruments of territorial management: plan classification 5 - Legal framework for land use 6 - Urban System - structure of urban space 7 - Morphological study of urban components. 8 – Guiding rules on urban planning 9 – Urban environments: rules and regulations 10 -Urbanization – a project design
Recommended reading	<p>Amado, M.P. – Planeamento urbano sustentável. Lisboa: ed. Caleidoscópio.</p> <p>Lobo, M.L.C., Correia, P., Pardal, S., Lobo, M.S. – Normas Urbanísticas: Volume I, II e III, DGOTDU-UTL, 2ª ed., 1995.</p> <p>Lobo, M.L.C. – Planeamento Regional e Urbano. Lisboa: Universidade Aberta, 1999</p>
Teaching methods	Lectures involving a theoretical explanation of concepts and legislation related to the urban phenomenon, with emphasis on the legal framework for town planning. Practical exercises related to the concepts learned and application of main guiding rules of current urban planning.
Assessment methods	Theory test, group work presented at the end of the semester, and several exercises prepared on practical classes.
Language of instruction	Portuguese

	B - Description of individual course units
Course title	Project
Course code	908936
Type of course	One-semester course
Level of Course	NA
Year of study	Third
Semester/trimester	Second
Number of credits	7
Name of lecturer	<p>Maria de Lurdes Belgas da Costa Reis – Building Module</p> <p>Cristina Margarida Rodrigues da Costa – Structure Module</p>
Objectives of the course (preferably expressed in terms of learning outcomes competences)	Systematization, application and development of the scientific and technical knowledge acquired in some degree subjects.
Prerequisites	Elementary knowledge of some disciplines such as Building Materials, General Building Processes, Management and Safety of Workmanships, Construction Physics, Concrete and Structures.
Course contents	Written and drawn elements of a project; analysis and consistency between the various project components, including architectural aspects, stability, water system, waste water system, electrical and telephone installations; design in execution plans; preparation of contract specifications documents; execution of safety plans; work planning: mapping, labour, material and equipment diagrams using Project software. Checking the structural safety of a building by means of specialized analysis methods. Design, pre-design, structural modelling, stress analysis and design of a building. Supporting documents and drawings of a stability project.
Recommended reading	Support texts and material available in the course webpage. Support bibliography from other degree subjects.
Teaching methods	Theoretical classes involving concept explanation. Practical classes involving problem solving and analysis of compliance of the projects with applicable legislation.
Assessment methods	Accomplishment of several practical assignments in both Modules and respective oral presentation.
Language of instruction	Portuguese