

ECTS Information Package: Degree Programme

Bachelor's degree in

# **CIVIL ENGINEERING**

*[www.gri.ipt.pt](http://www.gri.ipt.pt)*

# A - General Description

**Programme Title** - Engenharia Civil

**Qualification awarded** - Bachelor's degree in Civil Engineering

**Level of qualification** - First-Cycle degree, ISCED Level 5, EQF Level 6

## Specific admission requirements

### General

In order to be eligible to this bachelor's degree, students must hold the high-school diploma or legally equivalent qualification. Application can also be made through the following special entry routes:

- Students coming from the Portuguese education system through re-admission, degree change and transfer schemes;
- Holders of a Foundation Course Diploma (CET);
- Adults aged more than 23 who have passed tailor-made examinations intended to assess their ability to pursue higher education studies;
- Holders of Intermediary or Graduate degree diplomas;
- Students coming from foreign higher education.

### Specific

To be accepted for entry in the bachelor's degree in Civil Engineering one of the following national access examinations is required: (16) Mathematics and (07) Physics and Chemistry with a minimum grade of 95 out of 200.

Without prejudice to the general admission requirements and based on IPT's internal regulations, the following applicants may be admitted to the Civil Engineering programme subject to admission quotas:

- Candidates coming from the following regions: Castelo Branco, Leiria, Portalegre and Santarém (50%);
- Candidates who have completed in the preceding year the Technological Specialisation Course in Technical Supervision of Construction Works offered by ESTT, and
- Candidates who have completed level-4 Vocational Programs (20%).

### **Specific arrangements for recognition of prior learning (formal, non-formal and informal)**

#### General

Procedures on the recognition of credits gained in previous learning are established in the regulations for the Recognition and Validation of Qualifications and Skills of ESTT-IPT available at <http://webmanager.ipt.pt/mgallery/default.asp?obj=4535>

#### Specific

Not applicable

### **Qualification requirements and regulations:**

180 ECTS credits distributed across 6 curricular semesters (3 years), each with 40 weeks of full-time study (20 weeks per semester). Total study hours per year: 1620 (1 ECTS credit = 27 study hours).

The course structure comprises 6 modules per semester as set out in the course curriculum published by Decree-Law No.140/2008 dated 22 July.

### **Profile of the program:**

This study program provides a comprehensive training in civil engineering in areas such as Structures, Building, Geotechnics and Foundations, Hydraulics and Planning.

This degree complies with Bologna requirements and aims at providing the students with mobility, training and access to a wide range of career opportunities in circumstances similar to those offered by renowned European higher education institutions.

Training is supported by delivery methods that allow active learning based on the acquisition of theoretical knowledge and the development of practical coursework, projects, field trips and participation in technical lectures dealing with the resolution of engineering problems specially those related with construction works.

The course curriculum is profession-oriented and aims at providing the students with the ability to apply learned skills in the resolution of real engineering problems.

Graduates from this program are expected to be able to perform their activity in civil engineering related sectors and be part of multidisciplinary teams in such areas as development, project, conduction and supervision of construction works (both in the private and public sector) training and applied research.

**Key learning outcomes:**

Graduates in civil engineering should have developed a critical mindset that will enable them to understand, formulate and solve real engineering problems in a wide range of fields such as on-site management, construction materials and processes, structures and foundations, hydraulics, roadworks, work instrumentation and supervision and also the interactions with urbanism and town planning. They should also be aware of issues related with safety, construction quality, sustainability and environment.

They should be able to apply, through scientific methodologies, concepts of Mathematics, Physics, Continuum Mechanics, Geology and specific areas of expertise, keep pace with engineering developments and engage in lifelong learning.

They should also have a good command of computer technologies as an essential means of accessing, treating and disseminating information and a tool for the resolution of engineering problems.

They are expected to be proficient both orally and in writing and be able to communicate conclusions and respective reasoning both to specialists and non-specialists in a clear, unequivocal way.

**Occupational profiles of graduates with examples:**

The skills profile of civil engineering graduates provides a wide range of career prospects. Graduates are prepared to exercise their activity in several civil engineering sectors in such areas as development, project, conduction and supervision of construction works (both in the private and public sector) training and applied research.

Civil engineering graduates are prepared to perform as:

- Site managers;
- Construction supervisors;
- Promoters and managers of construction works and projects;
- Construction surveyors;
- Construction designers.

**Access to further studies:**

This civil engineering programme gives access to further studies at IPT, namely the Master's degree in Urban Rehabilitation delivered by ESTT or the Master's degree in Technical Maintenance of Buildings offered by ESTA.

The civil engineering degree allows pursuing to postgraduate or master studies in other programs as set out in the admission regulations established for those programs.

Graduates from this civil engineering degree have access to the Master's programme in Civil Engineering offered by Aveiro University in the framework of an agreement between IPT and Aveiro University.

### Course structure diagram with credits

Course Title	Year	Semester	Credits
Applied Mechanics	1	S1	5
Building Materials I	1	S1	5
Chemistry	1	S1	4
Linear Algebra	1	S1	5
Mathematical Analysis I	1	S1	6
Physics	1	S1	5
Applied Geology	1	S2	5
Building Materials II	1	S2	5
Mathematical Analysis II	1	S2	6
Statistics	1	S2	5
Strength of Materials I	1	S2	5
Technical Drawing	1	S2	4
Building design and detailing	2	S1	4
General Construction Processes I	2	S1	4
Hydraulics I	2	S1	5
Mathematical Analysis III	2	S1	5
Soil Mechanics I	2	S1	6
Strength of Materials II	2	S1	6
Concrete I	2	S2	6
General Construction Processes II	2	S2	4
Hydraulics II	2	S2	5
Soil Mechanics II	2	S2	5
Structures I	2	S2	6
Surveying	2	S2	4
Applied Hydraulics I	3	S1	5
Concrete II	3	S1	6
Construction Site Management and Safety	3	S1	5
Foundations	3	S1	5
Masonry and Wood Structures	3	S1	4

**Course structure diagram with credits (cont.)**

Course Title	Year	Semester	Credits
Structures II	3	S1	5
Applied Hydraulics II	3	S2	4
Building Physics	3	S2	5
Project	3	S2	7
Regional and Urban Planning	3	S2	5
Road Engineering	3	S2	5
Steel and Composite Structures	3	S2	4

## **Examination regulations, assessment and grading**

### General

General assessment rules are in line with the Portuguese law and described in the Academic Regulations of ESTT-IPT available at <http://webmanager.ipt.pt/mgallery/default.asp?obj=4538>.

The licenciado degree is awarded a final grade between 10 and 20 within a 0/20 scale as well as its equivalent in the European grading scale.

### Specific

Not applicable

## **Graduation requirements:**

In accordance with assessment rules, completion of the programme requires successful completion of all its constituent modules, i.e. 180 accumulated ECTS credits.

## **Mode of study:**

Full- or part-time.

## **Program director or equivalente**

Director: Anabela Mendes Moreira

Erasmus coordinator: Ana Paula Gerardo Machado

ECTS coordinator: Anabela Mendes Moreira

## B - Description of individual course units

<b>Course unit title</b>	Applied Mechanics
<b>Course unit code</b>	90895
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Cristina Margarida Rodrigues Costa
<b>Learning outcomes of the course unit</b>	Developing skills for solving problems on statics of particles and rigid bodies at rest in line with the current civil engineering applications.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basic knowledge of physics, mathematics and linear algebra.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	Introduction to vectorial mechanics. Applied Statics: 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. Plane trusses: stability methods to determine axial forces. Cables.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- JOHNSTON, R. e BEER, F. (2005). <i>Mecânica Vetorial para Engenheiros</i>. : Mc Graw Hill</li> <li>- GORFIN, B. e OLIVEIRA, M. (1975). <i>Estruturas Isostáticas</i>. Rio de Janeiro: Livros Técnicos e Científicos S. A.</li> <li>- Vários, <i>Apontamentos da disciplina de Mecânica 1 - FEUP/DEC</i>. Porto: FEUP-DEC</li> <li>- Vários, <i>Apontamentos da disciplina de Estática - IST/DEC</i>. Lisboa: IST-DEC</li> </ul>
<b>Planned learning activities and teaching methods</b>	Provision of the fundamental concepts of statics and practical methodologies for current applications of civil engineering. Analysis and discussion of case studies to promote critical participation and the consolidation of learned skills.
<b>Assessment Methods and criteria</b>	One final written exam during the regular assessment period, and practical exercises across the semester.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.



## B - Description of individual course units

<b>Course unit title</b>	Building Materials I
<b>Course unit code</b>	90896
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Maria de Lurdes Belgas da Costa
<b>Learning outcomes of the course unit</b>	Students should be able to - identify the different types of building materials with regard to manufacturing process, properties and applications - identify the standards and documents concerning the application of materials as well as quality control procedures - select materials
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1 – Introduction to building materials; 2 – Natural stones; 3 – Earth as building material; 4 – Mineral binders; 5 – Ceramics; 6 – Glass; 7 – Wood and wood based materials; 8 – Steel and non-ferrous metals; 9 – Polymeric materials (paints, varnishes, plastics and bituminous materials); 10 – Composite materials. 11 - The sustainability of the building materials
<b>Recommended or required Reading</b>	- APICER, A.(2009). <i>Manual de Alvenaria de Tijolo</i> . (Vol. -). Coimbra: APICER - Carvalho, A.(1996). <i>Madeiras Portuguesas</i> . (Vol. I, II). Lisboa: Instituto Florestal - Mascarenhas, J.(2003). <i>Sistemas de Construção – Paredes (2ª parte) e materiais básicos (1ª parte)</i> . (Vol. III). Lisboa: Livros Horizonte - LNEC, L.(2002). <i>Materiais plásticos para a construção civil - Características e tipos de aplicação</i> . (Vol. ITMC 29). Lisboa: LNEC
<b>Planned learning activities and teaching methods</b>	Lectures making use of illustrative examples. Problem solving. Field trips and technical sessions.
<b>Assessment Methods and criteria</b>	Written test (65%) and a research assignment (35%). Written test includes theoretical and practical components and minimum pass mark is 9.5/20. The research assignment is based on a selected topic.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Chemistry
<b>Course unit code</b>	90893
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	José Manuel Quelhas Antunes Marco António Mourão Cartaxo
<b>Learning outcomes of the course unit</b>	Develop skills on chemistry fundamentals and the role of Chemistry on general sciences and on civil engineering in particular. Acquisition of laboratory skills.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	Basic concepts. The structure of matter. Periodic Table. Chemical reactions. Stoichiometric calculus. Chemical balance. Acids and bases. Low-solubility salts. Oxidation-reduction.
<b>Recommended or required Reading</b>	- Chang, R.(1994). <i>Química</i> . Lisboa: McGraw Hill
<b>Planned learning activities and teaching methods</b>	Lectures and laboratory sessions.
<b>Assessment Methods and criteria</b>	Weighted average of the theoretical grade from a written test (intermediate or final assessment) and the practical grade from laboratory reports.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Linear Algebra
<b>Course unit code</b>	90892
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Ana Cristina Becerra Nata dos Santos Carlos Filipe Perquilhas Baptista
<b>Learning outcomes of the course unit</b>	1. Acquisition of knowledge in Linear Algebra and Analytic Geometry mathematical areas. 2. Provide students with several algebraic tools that are necessary for modeling and solving problems related to engineering. 3. Development of logical, analytical and critical reasoning thinking skills.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Knowledge of algebraic calculus.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	I. Matrices and Systems of Linear Equations; II. Determinants; III. Vector Spaces; IV. Eigenvalues and Eigenvectors; V. Analytic Geometry.
<b>Recommended or required Reading</b>	- Amaral, I. e Ferreira, M. (2008). <i>Álgebra Linear: Matrizes e Determinantes</i> . (Vol. 1º). (pp. 1-240). Portugal: Edições Sílabo - Amaral, I. e Ferreira, M. (2009). <i>Álgebra Linear: Espaços Vectoriais e Geometria Analítica</i> . (Vol. 2º). (pp. 1-160). Portugal: Edições Sílabo - Leon, S. (2009). <i>Linear Algebra with Applications</i> . (pp. 1-552). USA: Pearson - Nicholson, W. (1994). <i>Linear Algebra with Applications</i> . Boston: PWS Publishing Company
<b>Planned learning activities and teaching methods</b>	Theoretical and theoretical-practical lectures comprising content presentation and illustration.
<b>Assessment Methods and criteria</b>	Continuous assessment: two written closed-book tests, each worthing 10 points, and a minimum score of 3 grade points in each test. Exam assessment: one written closed-book test worthing 20 grade points including all taught topics.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Mathematical Analysis I
<b>Course unit code</b>	90891
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Luís Miguel Merca Fernandes Maria Manuela Morgado Fernandes Oliveira
<b>Learning outcomes of the course unit</b>	a)- To provide the basic concepts and mathematical methods usually used in this engineering programme. b)- To provide students with skills to work with differential and integral calculus in functions of one real variable.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	1- Preliminaries. 2- Real functions of a real variable. 3- Limits and continuity. 4- Differential calculus. 5- Integral calculus.
<b>Recommended or required Reading</b>	- Silva, J.(1999). <i>Princípios de Análise Matemática Aplicada</i> . (Vol. 1). (pp. 1-472). Lisboa: McGraw-Hill - Stewart, J.(2005). <i>Cálculo</i> . (Vol. 1). (pp. 1-684). São Paulo: Thomson Pioneira - Swokowski, E.(1995). <i>Cálculo com Geometria Analítica</i> . (Vol. 1). (pp. 1-744). São Paulo: Makron Books - Howard, A.(2007). <i>Cálculo um novo horizonte</i> . (Vol. 1). (pp. 1-581). São Paulo: Bookman
<b>Planned learning activities and teaching methods</b>	Theoretical lectures, with presentation and illustration of the proposed subjects. Theoretical-practical lectures in which exercises are proposed and solved.
<b>Assessment Methods and criteria</b>	Continuous assessment: two written tests. Exam assessment: one written test.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Physics
<b>Course unit code</b>	90894
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Rui Manuel Domingos Gonçalves
<b>Learning outcomes of the course unit</b>	Develop skills for the analysis and resolution of mechanics problems (kinematics and dynamics) with few idealized bodies.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basic knowledge of calculus and trigonometry.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1.Measurements and units. International System of Units. 4.Measures and Errors. 3.Kinematics of material point. 4.Dynamics of material point. Forces. 5.Work and Energy. 6.Rigid Body, Statics and Elasticity. 7.Vibration and waves.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Resnick,, H.(2000). <i>Física</i>. (Vol. I). S. Paulo: Livros Técnicos e Científicos</li> <li>- Alonso, . e Finn, . (2000). <i>Física - um curso Universitário (vol. I - Mecânica e vol. II - Campos e Ondas)</i>. Brasil: Edgard Blucher</li> <li>- Almeida, G.(2002). <i>Sistema Internacional de Unidades..</i> Lisboa: Platano editora</li> </ul>
<b>Planned learning activities and teaching methods</b>	Lectures introducing the concepts, principles and applications of physics laws of mechanics. Practical classes involving problem solving.
<b>Assessment Methods and criteria</b>	Individual worksheets. Comprehensive written test (oral in exceptional cases).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Applied Geology
<b>Course unit code</b>	908911
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Ana Paula Gerardo Machado
<b>Learning outcomes of the course unit</b>	Students should be able to distinguish between the different minerals, rocks and geological structures and understand their mechanical behaviour and application in civil engineering. Interpretation of geological maps and geological profiles.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basics of Natural Sciences and Chemistry
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1. Structure and composition of the Earth 2. Internal geodynamics 3. Material types, scalar and directional properties and chemical unions 4. Crystallography and crystallochemistry 5. Study of minerals and rocks, laboratorial identification 6. Geologic structures 7. Study and geotechnical classification of rock masses 8. Geological maps and geological profiles 9. Portuguese geology
<b>Recommended or required Reading</b>	- Costa, J.(2001). <i>Estudo e Class. das Rochas por Exame Macroscópico</i> . (Vol. -). -: F.C.G. - Wilson, R. e Smith, P. e Gass, I. (1984). <i>Vamos Compreender a Terra</i> . (Vol. -). Coimbra: - - Plummer, C. e McGeary, D. e Carlson, D. (2003). <i>Physical Geology</i> . (Vol. -). -: Mc Graw Hill - Paquet, J. e Dercourt, J. (1986). <i>Geologia, Objecto e Métodos</i> . (Vol. -). Coimbra: Almedina
<b>Planned learning activities and teaching methods</b>	Lectures and laboratory classes including macroscopic identification of minerals and rocks and preparation of geological profiles.
<b>Assessment Methods and criteria</b>	Written examination, with minimum grade of 40% in each component (theoretical and practical) and a minimum global average mark of 9,5.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Building Materials II
<b>Course unit code</b>	908912
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Fernando Dias Martins
<b>Learning outcomes of the course unit</b>	Provide basic training in the field of materials and laboratory techniques for testing. Student must be able to: select materials; study an aggregate; determine the mix of two or more aggregates, study the composition of a concrete; to do concrete tests.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1-Aggregates.Properties of raw materials, particle size analysis 2-Mortars: definition, types, properties, shrinkage, adhesion and additives. 3-Concrete. Classes of concrete, environmental exposure, study of the composition of concrete, tests on fresh and hardened concrete.4-Binders: definition, air and hydraulic binders, cements.
<b>Recommended or required Reading</b>	- Coutinho, A. <i>Fabrico e propriedades do betão</i> . (Vol. -). -: LNEC - Bauer, L. <i>Materiais de Construção</i> . (Vol. -). -: Livraria Escolar Editora - Montoya, J. <i>Hormigon Armado</i> . (Vol. -). -: Ed. Gustavo Gili S.A. - EN's, N.(2009). <i>E-N's (parciais) relacionadas</i> . (Vol. xs). (pp. xx-yy). IMP.N.: IMP. N.
<b>Planned learning activities and teaching methods</b>	Lectures on the characterisation and properties of raw materials for the manufacture of mortars/concrete and for the formulation of the composition of concrete. Laboratory testing and problem solving on concrete aggregates and fresh/hard concrete.
<b>Assessment Methods and criteria</b>	Assessment is based on reports (20%) and a written test (intermediate test or exam)(80%).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in French</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Mathematical Analysis II
<b>Course unit code</b>	90897
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Maria Cristina Oliveira Da Costa
<b>Learning outcomes of the course unit</b>	1- To provide the basic concepts and mathematical methods usually used in this engineering degree programme. 2- To provide students with the skills to work with differential and integral calculus in functions of several real variables.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Mathematical Analysis I.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1- Numerical and Functions Series. 2- Real functions of several real variables. 3- Multiple Integrals.
<b>Recommended or required Reading</b>	- Silva, J.(1999). <i>Princípios de Análise Matemática Aplicada</i> . (Vol. 1). (pp. 1-472). Lisboa: McGraw-Hill - Swokowski, E.(1995). <i>Cálculo com Geometria Analítica</i> . (Vol. 2). (pp. 1-744). São Paulo: Makron Books - Zill, D. e Cullen, M. (2009). <i>Advanced Engineering Mathematics</i> . (Vol. 1). (pp. 1-1008). Sudbury: Jones & Bartlett Publishers - Jerónimo, M. e Azenha, A. (1995). <i>Cálculo Diferencial e Integral em <math>R</math> e <math>R^n</math></i> . (Vol. 1). (pp. 1-610). Lisboa: Mac Graw-Hill
<b>Planned learning activities and teaching methods</b>	Lectures and tutorials
<b>Assessment Methods and criteria</b>	Continuous assessment: 1 written closed-book test. Exam assessment: 1 written closed-book test.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.



## B - Description of individual course units

<b>Course unit title</b>	Statistics
<b>Course unit code</b>	90898
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Luis Miguel Lindinho da Cunha Mendes Grilo
<b>Learning outcomes of the course unit</b>	Students will be provided with the basics of some key statistics techniques and methodologies, mainly quantitative, so that they can design and implement solutions to different problems under uncertainty conditions.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Knowledge of Calculus and Algebra
<b>Recommended optional programme components</b>	Occasionally, exercises are solved on Excel spreadsheet and the statistical package SPSS.
<b>Course contents</b>	1 Probability (axioms and theorems), 2 Discrete and continuous random variables; 3 Some theoretical probability distributions (discrete and continuous); 4 Sampling and sampling distributions (mean, variance and sample proportion) 5 Point and interval estimation parameters, 6 Parametric hypothesis tests (mean, variance and population proportion); 7 Correlation and simple linear regression.
<b>Recommended or required Reading</b>	- Guimarães, R. e Cabral, J. (2007). <i>Estatística</i> . Lisboa - Portugal: McGraw-Hill - Gama, S. e Pedrosa, A. (2004). <i>Introdução Computacional à Probabilidade e Estatística</i> . Porto - Portugal: Porto Editora
<b>Planned learning activities and teaching methods</b>	Lectures and tutorials including problem solving.
<b>Assessment Methods and criteria</b>	Written tests: continuous assessment(two written tests); exam assessment (one written test).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Strength of Materials I
<b>Course unit code</b>	908910
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Luis Filipe Rocha de Almeida
<b>Learning outcomes of the course unit</b>	Acquire the basic skills on Strength of Materials that will allow the understanding and calculation of stresses and strains caused by axial loads.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	An introduction to Strength of Materials. Fundamental concepts. Mass geometry. Tensile strength and compression. Bending.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Farinha, J. e Reis, A. (1996). <i>Tabelas Técnicas</i>. -: ETL, Lda.</li> <li>- Silva, V.(1995). <i>Mecânica e Resistência dos Materiais</i>. -: Zuari</li> <li>- NASH, W.(2001). - <i>NASH, William; Ed. McGraw - Resistência de Materiais - Hill de Portugal, Lda., 2001</i>. Portugal: Hill de Portugal, Lda</li> <li>- JUVANDES, L.(2001). JUVANDES, Luís F. P. - <i>Resistência de Materiais 1.FEUP, I</i>,</li> </ul>
<b>Planned learning activities and teaching methods</b>	Theoretical classes exploring concepts and practical classes involving skill application and exercise solving.
<b>Assessment Methods and criteria</b>	Written test and practical project.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Technical Drawing
<b>Course unit code</b>	908918
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	First Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Inês Domingues Serrano
<b>Learning outcomes of the course unit</b>	To develop skills of analysis and comprehension in order to understand and represent with accuracy any object, even complex ones, both by hand and using CAD tools.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course content</b>	1. Technical Drawing Drawing design Rules and Standards Sheet layout and drawing Formats Scales and proportion 2. Types of lines and its application Projections Orthographic views Multiple orthogonal projection Rapid Views Perspective 3. Section Views slices and sections 4. Dimensioning 5. Computer Aided Design – CAD
<b>Recommended or required Reading</b>	- Cunha, L.(2002). <i>Desenho Técnico</i> . Lisboa: FCG - Silva, A. e Dias, J. e Sousa, L. (2002). <i>Desenho Técnico Moderno</i> . Lisboa: Lidel
<b>Planned learning activities and teaching methods</b>	Lectures combined with practical classes involving problem solving.
<b>Assessment Methods and criteria</b>	Assessment is continuous and requires a minimum attendance of two-thirds of planned practical classes and 3 examination. With a mark below 9.5/20 students will be eligible for taking the final exam. Exam: Technical drawing test
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Building design and detailing
<b>Course unit code</b>	908937
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Jorge Morarji dos Remédios Dias Mascarenhas Inês Domingues Serrano
<b>Learning outcomes of the course unit</b>	This course aims to prepare future professionals to clearly interpret and describe working drawings (in terms of communication with the construction site), taking into account the different construction procedures, functional requirements, dimensioning and technical regulations.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	n.a.
<b>Recommended optional programme components</b>	n.a.
<b>Course contents</b>	I.Building Design Introduction Basics of building design Project stages Building design Dimensioning Surveying Building regulations II.Detailing Drawing of a number of construction details
<b>Recommended or required Reading</b>	- Neufeuert, E.(1981). <i>A arte de projectar em Arquitectura</i> . São Paulo: Gustavo Gili - Cecarini, I.(1993). <i>A Composição da Casa</i> . Lisboa: Presença - Mascarenhas, J.(2007). <i>Sistemas de Construção: Paredes</i> . (Vol. II). Lisboa: Livros Horizonte - Mascarenhas, J.(2009). <i>Sistemas de Construção: coberturas inclinadas</i> . (Vol. VI). Lisboa: Livros Horizonte
<b>Planned learning activities and teaching methods</b>	All lessons include practical exercises in line with theoretical concepts. Coursework is assessed on a continual basis, which allows student monitoring and increased academic performance.
<b>Assessment Methods and criteria</b>	Assessment is continuous. Attendance is compulsory Average mark for practical works(Mtp)> 9.50; Calculation formula: $Mtp = (MDe + Mp) / 2$ ; Below 9.5/20 in continuous assessment students will be eligible for final examination.Examination:written test.
<b>Language of Instruction</b>	Portuguese
<b>Work placement(s)</b>	n.a.

## B - Description of individual course units

<b>Course unit title</b>	General Construction Processes I
<b>Course unit code</b>	908914
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Jorge Morarji dos Remédios Dias Mascarenhas Anabela Mendes Moreira
<b>Learning outcomes of the course unit</b>	A detailed overview of the different construction processes including techniques, materials, operational sequences, machinery and tools as well as good practices and construction safety.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	1-Preparatory works;2 Demolitions;3-Foundations (direct, indirect and basements);4-Soil Containment;5-Traditional exterior wall (functional requirements);6- Structural frames of buildings(wood, concrete and metal);7-Roof structures;8-Components and demands of various construction details;9-Formwork;10-Special Construction Processes;11-Prefabrication
<b>Recommended or required Reading</b>	- Mascarenhas, J.(2003). <i>Sistemas de Construção Vol I</i> . (Vol. I). (pp. 220 -250). Lisboa: Livros Horizonte - Mascarenhas, J.(2005). <i>Sistemas de Construção, Vol IV</i> . (Vol. IV). (pp. 220-250). Lisboa: Livros Horizonte - Mascarenhas, J.(2004). <i>Sistemas de Construção, Paredes, Vol II</i> . (Vol. II). (pp. 220-250). Lisboa: Livros Horizonte
<b>Planned learning activities and teaching methods</b>	Lectures with illustrative examples of detailed processes from a manual prepared by one the leacturers.
<b>Assessment Methods and criteria</b>	Assessment: written tests and lesson work. Criteria: -Ability to distinguish between the various construction processes and their advantages -Construction sequence -Recognition of appropriate machinery and tools
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Hydraulics I
<b>Course unit code</b>	908916
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	José Luis A. Bobela Bastos Carreira
<b>Learning outcomes of the course unit</b>	The students should acquire basic skills on hydraulics that will allow them to solve practical problems such as calculating flow rates, head loss, hydraulic power and others.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	General concepts of physics
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	1. Fluid properties 2. Hydrostatics 3. Dimensional analysis 4. Similarity theory 5. Hydrokinematics 6. Fundamentals of hydrodynamics 7. An overview of fluid flows 8. Momentum equations 9. Head loss flow laws 10. Steady flow in pipe networks
<b>Recommended or required Reading</b>	- Quintela, A.(2011). <i>Hidráulica</i> . Lisboa: Fundação Calouste Gulbenkian - White, F.(1999). <i>Fluid Mechanics</i> . New York: McGraw-Hill
<b>Planned learning activities and teaching methods</b>	Lectures focusing on the theoretical content of the course and practical classes involving concept application and exercise solving.
<b>Assessment Methods and criteria</b>	Practical assignments and written examination. Written examination with minimum grade of 40% in each component (theoretical and practical).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Mathematical Analysis III
<b>Course unit code</b>	908913
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Luís Miguel Merca Fernandes Maria Cristina Oliveira Da Costa
<b>Learning outcomes of the course unit</b>	Students should be provided with basic and more advanced knowledge of mathematical methods used in different civil engineering problems. They should be able to apply appropriate analytical and numerical methods to solve differential and integral equations.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Mathematical Analysis I Mathematical Analysis II Linear Algebra
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	1.1 Line integrals; 1.2 Surface Integrals; 2.1 First order Differential equations; 2.2 Differential equations of order greater than one; 3.1 Numerical methods for non-linear equations; 3.2 Polynomial Interpolation 3.3 Numeric Integration; 3.4 Numerical methods for solving initial value problems.
<b>Recommended or required Reading</b>	- Silva, J.(1994). <i>Princípios de Análise Matemática Aplicada</i> . Lisboa: Mc Graw-Hill - Anton, H.(2000). <i>Cálculo, um novo horizonte</i> . (Vol. 2). São Paulo: Bookman - Pina, H.(1995). <i>Métodos Numéricos</i> . Portugal: Mc Graw-Hill - Zill, D.(2008). <i>A First Course in Differential Equations</i> . EUA: Brooks Cole
<b>Planned learning activities and teaching methods</b>	Lectures making use of illustrative examples and case studies. Tutorials involving problem solving.
<b>Assessment Methods and criteria</b>	Written tests(intermediate assessment:2 written tests;exam assessment:1 global written test).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Soil Mechanics I
<b>Course unit code</b>	908917
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Ana Paula Gerardo Machado
<b>Learning outcomes of the course unit</b>	Acquisition and application of knowledge in the following areas: -Soil composition and properties; -Standardisation and laboratory testing; -Field compaction and control; -Stress calculation; -Seepage; -Instability phenomena resulting from groundwater flow.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Knowledge of Physics, Mathematics, Chemistry and Applied Geology
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	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.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Fernandes, M.(2009). <i>Mecânica dos Solos</i>. (Vol. I ). Porto: FEUP</li> <li>- Berry, P. e Reid, D. (1993). <i>An Introduction to Soil Mechanics</i>. (pp. 1-317). UK: McGraw-Hill</li> <li>- Correia, A.(1987). <i>Ensaio para Controlo de Terraplenagens</i>. Lisboa: LNEC</li> <li>- LNEC, L.(1967). <i>Normas Portuguesas para a Realização de Ensaio</i>. Lisboa: LNEC</li> </ul>
<b>Planned learning activities and teaching methods</b>	Theoretical and interactive classes. Examples of practical construction works and exercise solving. Laboratory testing.
<b>Assessment Methods and criteria</b>	Assessment is based on written tests, with theoretical and practical components (85%) and a laboratory assignment(mandatory) (15%) Pass requirement: A minimum of 40% in each component and a minimum global mark of 9.5 is required to pass.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.



## B - Description of individual course units

<b>Course unit title</b>	Strength of Materials II
<b>Course unit code</b>	908915
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Fernando Dias Martins
<b>Learning outcomes of the course unit</b>	Strength of Materials II is a follow-up to Strength of Materials I and aims to provide the students with basic skills that will allow them to calculate bending stress and deformation and analyse structural elements under elastic instability.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Strength of Materials I
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1 - Tangential stresses in beams under simple bending: thin-wall beams, open-section beams and cellular beams; 2- Deformation of a bar under torsion; 3 - State of stress and deformation; 4 - Analysis of structural elements under combined stresses; 5 - Elastic instability in linear and bent elements; 6 - Calculation of deformations
<b>Recommended or required Reading</b>	<p>- Silva, V.(1995). <i>Mecânica e Resistência dos Materiais</i>. (Vol. -). -: Zuari</p> <p>- Beer, F.<i>Mecânica dos Materiais</i>. (Vol. -). (pp. ---). -: ISBN</p> <p>- Juvandes, L.(0). <i>R. dos Materiais 2 - Aulas Teóricas - Ano letivo 2004/5</i>.Acedido em23 de março de 2015 em <a href="http://sigarra.up.pt/feup/pt/UCURR_GERAL.FICHA_UC_VIEW%3Fpv_ocorrencia_id%3D276609">http://sigarra.up.pt/feup/pt/UCURR_GERAL.FICHA_UC_VIEW%3Fpv_ocorrencia_id%3D276609</a></p> <p>- Juvandes, L.(0). <i>R. dos Materiais 1+2 - Textos de Apoio - Coleção de Exercícios</i>.Acedido em23 de março de 2015 em <a href="http://sigarra.up.pt/feup/pt/UCURR_GERAL.FICHA_UC_VIEW%3Fpv_ocorrencia_id%3D276609">http://sigarra.up.pt/feup/pt/UCURR_GERAL.FICHA_UC_VIEW%3Fpv_ocorrencia_id%3D276609</a></p>
<b>Planned learning activities and teaching methods</b>	Lectures presenting concepts and foundations and practical classes focused on practice and problem solving.
<b>Assessment Methods and criteria</b>	Ongoing assessment: a written test (theoretical and practical) and a compulsory assignment; Exam-based assessment:a written exam (theoretical and practical)
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in French</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Concrete I
<b>Course unit code</b>	908924
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Luis Filipe Rocha de Almeida
<b>Learning outcomes of the course unit</b>	The students should acquire skills that will enable them to design concrete structures that comply with safety requirements.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Solid knowledge of Applied Statics. Good foundations of Strength of Materials.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	Constituent materials of the 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.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Guerrina, A. <i>Concreto Armado</i>. -: Hemus Ed. Ltd.</li> <li>- Montoya, P. e Meseguer, A. e Cabré, F. (1987). <i>Hormigón Armado</i>. -: -</li> <li>- Monning, E. e Leonhardt, F. <i>Construções de Concreto</i>. (Vol. I, II e III). -: -</li> </ul>
<b>Planned learning activities and teaching methods</b>	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.
<b>Assessment Methods and criteria</b>	Assignments and one “open book” test as periodical assessment or final examination in the regular exam periods.
<b>Language of Instruction</b>	Portuguese
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	General Construction Processes II
<b>Course unit code</b>	908920
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Maria de Lurdes Belgas da Costa
<b>Learning outcomes of the course unit</b>	The students should understand that the functional performance of the building elements depends on the conformity of the materials employed and the technical solution adopted, and acquire technical competencies that will allow them to use appropriate solutions to practical problems.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Construction Materials I and II General Construction Process I.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1. Introduction 2. Walls: masonry and concrete walls 3. Wall coverings 4. Moisture in walls 5. Cracking in masonry walls 6. Floor coverings 7. Roofs and flat roofs. 8. New materials and new construction processes.
<b>Recommended or required Reading</b>	- CTCV, A.(1998). <i>Manual de Aplicação de Telhas Cerâmicas</i> . (Vol. 1). Coimbra: CTCV - CTCV, A.(2003). <i>Manual da Aplicação de REvestimentos Cerâmicos</i> . (Vol. 1). Coimbra: CTCV - CTCV, A.(2009). <i>Manual de Alvenaria de Tijolo</i> . (Vol. 1). Coimbra: CTCV
<b>Planned learning activities and teaching methods</b>	Lectures on fundamental aspects of the technologies and construction processes Presentation of practical cases. Case analysis and discussion with critical intervention by the students. Study visits and technical sessions.
<b>Assessment Methods and criteria</b>	Assessment includes a written test (55%) and a practical assignment(45%). Assignment consists of a report on building works monitored by the student during the semester or a monograph.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Hydraulics II
<b>Course unit code</b>	908922
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	António Manuel Dias Cavalheiro
<b>Learning outcomes of the course unit</b>	Students should acquire skills that will allow them to solve general hydraulic problems, such as dimensioning pipes and open channels, water hammer, flows and fluid machinery.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basics of Hydraulics I
<b>Recommended optional programme components</b>	Hydraulics I
<b>Course contents</b>	1 - Water hammer analysis. 2 - Open-channel flow 3 - Pipe orifice. 4 - Elementary theory of notches and weirs 5 - Flow measurements. 6 - Fluid machinery.
<b>Recommended or required Reading</b>	- Lencastre, A.(1996). <i>Hidráulica Geral</i> . (Vol. Não aplicável). Coimbra: Gráfica de Coimbra - Quintela, A.(1981). <i>Hidráulica</i> . (Vol. Não aplicável). Lisboa: Fundação Calouste Gulbenkian
<b>Planned learning activities and teaching methods</b>	Lectures focusing on the presentation and illustration of the proposed topics. Theoretical-practical classes including practice and problem solving.
<b>Assessment Methods and criteria</b>	Practical assignment and intermediate written test or final examination.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Soil Mechanics II
<b>Course unit code</b>	908923
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Ana Paula Gerardo Machado
<b>Learning outcomes of the course unit</b>	The students should be able to calculate stresses and strains, solve problems related with shear strength, slope stability and lateral earth pressure on retaining walls and have some knowledge of prospection and testing.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Good knowledge of Physics, Mathematics, Chemistry, Applied Geology, Soil Mechanics I and Hydraulics I.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	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.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Fernandes, M.(2007). <i>Mecânica dos Solos</i>. (Vol. I e II). Porto: FEUP</li> <li>- Cernica, J.(1995). <i>Geotechnical Engineering: Soil Mechanics</i>. (pp. 1-480). USA: John Wiley &amp; Sons</li> <li>- Reid, D. e Berry, P. (1993). <i>An Introduction to Soil Mechanics</i>,. (pp. 1-317). UK: MacGarw-HILL</li> <li>- Terzaghi, K. e Peck, R. (1967). <i>Soil Mechanics in Engeneering Practice</i>,. (pp. 1-729). USA: John Wiley</li> </ul>
<b>Planned learning activities and teaching methods</b>	Theoretical and interactive classes focusing on the key aspects of the discipline. Illustrative examples of practical construction works. Exercise solving and laboratory testing.
<b>Assessment Methods and criteria</b>	Written test in the three regular seasons including theoretical and practical components. Pass requirements: a mark of at least 40% in each component and a minimum global average mark of 9.5
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Structures I
<b>Course unit code</b>	908921
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Carlos Jorge Trindade da Silva Rente
<b>Learning outcomes of the course unit</b>	Formulation and application of methods of analysis of statically indeterminate structures in linear elasticity. Awareness of the factors that contribute to the structural behavior in the context of structural design.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basic concepts of Statics and Strength of Materials.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	General principles of static equilibrium of solids and structures. Introduction to structural analysis. Virtual work theorem. Force Method. Energy Methods. Displacement Method. Moment Distribution Method. Introduction to the influence lines theory.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Neville, A. e Ghali, A. (1997). <i>Structural Analysis. A unified and matrix approach</i>. London: E&amp;FN Spon</li> <li>- Hibbeler, R.(2006). <i>Structural Analysis</i>. Singapore: Prentice Hall</li> <li>- McGuire, W. e Gallagher, R. e Ziemian, R. (2000). <i>Matrix Structural Analysis</i>. New York: John Wiley and Sons</li> </ul>
<b>Planned learning activities and teaching methods</b>	Lectures on the fundamental aspects related to the main topics of the course. Practical resolution of exercises oriented to promote critical skills and participation of students in the class topics.
<b>Assessment Methods and criteria</b>	One final written exam during the regular assessment season and practical exercises proposed on class.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Surveying
<b>Course unit code</b>	908919
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Second Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Fernando Manuel Lino Gonçalves Antunes
<b>Learning outcomes of the course unit</b>	Learn basic knowledge of topography and its application in the performance of Civil Engineering activities. Be able to use the machinery and make minor topographic surveying and design construction site layouts.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Mathematics
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contents</b>	General elements of topography. The theodolite. Measuring distances. General surveying methods. Levelling. Topographic applications.
<b>Recommended or required Reading</b>	- Gonçalves, J. e Madeira, S. e Sousa, J. <i>Topografia - Conceitos e Aplicações</i> . -: - - -, -. <i>Topografia Geral</i> . (Vol. -). -: Ed. Tecnicas Xerez - -, -. <i>Tratado General de Topografia</i> . (Vol. -). Barcelona: Ed. Gustavo Gili S.A. - Doménech, F. <i>Topografia</i> . (Vol. -). -: Coleção Construções e Móveis
<b>Planned learning activities and teaching methods</b>	Lectures and practical classes involving exercise solving.
<b>Assessment Methods and criteria</b>	Continuous assessment. Practical fieldwork and in-office work. Theoretical and practical written tests. A minimum of 2.5 in the theoretical part is required to pass. Final assessment: written test (100%)
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Applied Hydraulics I
<b>Course unit code</b>	908930
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	António Manuel Dias Cavalheiro
<b>Learning outcomes of the course unit</b>	Students should develop skills to design water and wastewater engineering public systems.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basics of Hydraulics I and II
<b>Recommended optional programme components</b>	Hydraulics I and II
<b>Course contents</b>	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; 7 - Structural design and drain implantation. 8 - Introduction to household water and domestic wastewater treatment systems. 9 - Design of drainage networks
<b>Recommended or required Reading</b>	- Não Aplicável, N. <i>Manual de Saneamento Básico</i> . (Vol. I e II). Não aplicável: Direcção Geral dos Recursos Hídricos - Não Aplicável, N. <i>Regulamento Geral de Distribuição de Águas e Drenagem de Águas Residuais</i> . (Vol. Não aplicável). Não aplicável: Não aplicável
<b>Planned learning activities and teaching methods</b>	Lectures focusing on presentation and illustration of the proposed topics. Theoretical-practical classes involving practice and problem solving.
<b>Assessment Methods and criteria</b>	Three coursework assignments
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.



## B - Description of individual course units

<b>Course unit title</b>	Concrete II
<b>Course unit code</b>	908925
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	6
<b>Name of Lecturer(s)</b>	Luis Filipe Rocha de Almeida
<b>Learning outcomes of the course unit</b>	The students should develop skills that enable them to calculate slabs and foundations in reinforced concrete; to calculate and detail reinforcement structures and to check safety limits for reinforced and prestressed concrete structures.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Knowledge of Applied Statics and basics of Strength of Materials.
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	Slabs; Foundations; Wall beams and short cantilever beams; Retaining walls; Provisions concerning improved ductility structures; Limit states; Reinforced and pre-stressed concrete.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Leonhardt, F. e Monning, E. <i>Construções de Concreto</i>. (Vol. I, II e III). -: -</li> <li>- Montoya, P. e Meseguer, A. e Cabré, F. (1987). <i>Hormigón Armado</i>. -: Gustavo Gili S.A.</li> <li>- Guerrina, A. <i>Concreto Armado</i>. -: Hemus Ed. Ltd.</li> </ul>
<b>Planned learning activities and teaching methods</b>	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 applying theoretical concepts.
<b>Assessment Methods and criteria</b>	Coursework and one “open book” test as intermediate assessment or final examination in the regular exam periods.
<b>Language of Instruction</b>	Portuguese
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Construction Site Management and Safety
<b>Course unit code</b>	908926
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Anabela Mendes Moreira
<b>Learning outcomes of the course unit</b>	An overview of the principles and concepts of construction management and health and safety at the construction site.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Building Materials I, Building Materials II, Concrete II, General Building Processes, Building Design and Detailing.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	Measurement standards; Construction budgets; Resource planning and management; Price adjustment; Health and safety at work: integrated safety, collective and individual protection; Noise and vibration; Prevention mechanisms; On-site Safety.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Holroyd, T.(1999). <i>Site management for engineers</i>. London: . London: Thomas Telford</li> <li>- Clarke, T.(1999). <i>Managing health and safety in building and construction</i>.. London: Oxford: Butterworth Heinemann.</li> <li>- Forster, G.(1989). <i>Construction site studies – Production, administration and personnel</i>. London: Longman Scientific &amp; Technical</li> </ul>
<b>Planned learning activities and teaching methods</b>	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.Lecture notes in electronic document form (b-learning).
<b>Assessment Methods and criteria</b>	Optional assignment (15%). Closed book test or exam (85% with the option of assignment) or 100% (without the option of assignment).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Foundations
<b>Course unit code</b>	908928
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Fernando Manuel Lino Gonçalves Antunes
<b>Learning outcomes of the course unit</b>	Design of shallow foundations as a function of soil type and depth; settlements and their consequences. Basics of deep foundations. Soil containment processes. Pre-dimensioning and stability check of rigid and flexible retaining walls.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Mechanics of soils. Strength of Materials
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	Shallow foundations. Deep foundations. Soil-retaining structures. Excavations.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Bowles, J. <i>Foundation Analysis and Design</i>. (Vol. -). -: -</li> <li>- Peck, -, e Hanson, -, e Thornburn, -. <i>Foundation Engineering</i>. (Vol. -). -: -</li> <li>- Tomlinson, M. <i>Foundation Design and Construction</i>. (Vol. -). -: -</li> <li>- Peck, -, e Terzaghi, -. <i>Mecânica dos Solos e Engenharia Prática</i>. (Vol. -). -: -</li> </ul>
<b>Planned learning activities and teaching methods</b>	Lectures and exercises followed by resolution of practical cases.
<b>Assessment Methods and criteria</b>	Written tests (intermediate test or final exam) Pass requirement: a minimum mark of 3.0 in the theoretical part of the written test is required.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Masonry and Wood Structures
<b>Course unit code</b>	908938
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Cristina Margarida Rodrigues Costa
<b>Learning outcomes of the course unit</b>	Students should become familiar with the common construction techniques in resistant masonry, timber roofs and pavements; acquire the skills to apply previous knowledge of structural engineering and applicable regulations for the design of these structures.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	Masonry and wood structures: types and performance of structural systems; buildings of resistant masonry with rigid and flexible pavements; materials properties; design for ultimate limit states; global stability of masonry structures; structural connections; serviceability limit states; constructive details; composite wood-concrete floors.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Vários Autores, <i>Regulamentos: RSA, EC1, EC5, EC6 e EC8..</i> -: Várias</li> <li>- Lourenço, P. <i>Manual de Dimensionamento Estrutural.</i> . : APICER</li> <li>- Faria , A. e Negrão, J. (2009). <i>Projecto de Estruturas de Madeira.</i> : Publindústria</li> <li>- Ogden, R. e Henley , R. (1996). <i>Connections between steel and other materials.</i> Berkshire, UK: SCI</li> </ul>
<b>Planned learning activities and teaching methods</b>	Theoretical-practical lessons include presentation of theoretical considerations and discussion of practical issues. Practical lessons include tasks such as analysis and dimensioning of real-world examples.
<b>Assessment Methods and criteria</b>	Assessment consists of a written test (80% of the final mark) of a theoretical-practical nature worth 20 grade points, with the minimum pass mark of 9 grade points, and a practical assignment worth 20 grade points (20% of the final mark).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Structures II
<b>Course unit code</b>	908927
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	First Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Carlos Jorge Trindade da Silva Rente
<b>Learning outcomes of the course unit</b>	Students should understand the principles, theories and models for the analysis of structural systems subjected to static and dynamics loads. They should also understand modelling and analysis of internal forces and structural displacements and use simplified methods of structural analysis.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Basic concepts of Statics, Dynamics and Strength of Materials.
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contents</b>	Structural design. Preliminary design and safety check. Structures subject to vertical load. Structures subject to lateral load: bracing systems, wind and seismic design. Computer-aided analysis and design of structures.
<b>Recommended or required Reading</b>	- Figueiras, J.(1985). <i>Apontamentos de estruturas de edificios</i> . Porto: FEUP - Varios, .(1986). <i>Curso sobre a Nova Regulamentacao de Estruturas</i> . Porto: FEUP
<b>Planned learning activities and teaching methods</b>	Lectures and practical classes focusing on the resolution of exercises oriented to promote a critical mindset and class participation amongst the students.
<b>Assessment Methods and criteria</b>	One final written exam during regular assessment season, and practical coursework carried out on class.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Applied Hydraulics II
<b>Course unit code</b>	908934
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	António Manuel Dias Cavalheiro José Luis A. Bobela Bastos Carreira
<b>Learning outcomes of the course unit</b>	The students should develop skills that will enable them to solve hydrology problems and design water and wastewater engineering building systems.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Concepts of Hydraulics I and II
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	1. Types of distribution systems 2. Water distribution systems in buildings 3. Hot water production and distribution systems 4. Sewerage and pluvial drainage systems 5. The water cycle and Hydrological basin 6. Rainfall 7. Surface interception and uptake. 8. Evaporation and total loss 9. Surface runoff. Rainfall-runoff models 10. Erosion and sedimentation
<b>Recommended or required Reading</b>	- Lencastre, A. e Franco, F. (2010). <i>Lições de hidrologia</i> . Lisboa: Fundação da Faculdade de Ciências e Tecnologia - Pedroso, V.(2000). <i>Manuel dos Sistemas Prediais de Distribuição e Drenagem de Águas</i> . Lisboa: LNEC - Mays , L. e Maidment, D. e Chow, V. (1988). <i>Applied Hydrology</i> . New York: McGraw-Hill
<b>Planned learning activities and teaching methods</b>	Theoretical classes with presentation of concepts and practical classes with problem analysis and solving.
<b>Assessment Methods and criteria</b>	Practical assignments and written examination. Written examination with minimum grade of 40% in each component (theoretical and practical).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Building Physics
<b>Course unit code</b>	908933
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Anabela Mendes Moreira Maria de Lurdes Belgas da Costa
<b>Learning outcomes of the course unit</b>	Students should get familiar with aspects related with fire safety and thermal and acoustic comfort in buildings. They should acquire skills that will allow them to select the best solutions within applicable regulations (REH,RSCIE e RRAE).
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	General knowledge of materials and general construction processes.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contents</b>	1-Introduction to Building Physics. 2-Thermal performance of buildings. 3-Hygrometric behaviour of buildings. 4-Natural ventilation of buildings. 5-Fire Safety in Buildings. 6-Acoustics (noise measurement, room acoustics and sound insulation).
<b>Recommended or required Reading</b>	- Abrantes, J. e Castro, C. (2009). <i>Manual de Segurança Contra Incêndio em Edifícios</i> . (Vol. 1). Sintra: ENB - Vigran, T.(2008). <i>Building Acoustics</i> . London: Taylor & Francis - Braga, A. e Piedade, A. e Rodrigues, A. (2009). <i>Térmica de Edifícios</i> . (Vol. 1). Amadora: Edições Orion
<b>Planned learning activities and teaching methods</b>	Theoretical classes involving concept presentation. Practical classes involving problem solving and analysis of the compliance of a project with the REH. B-learning is used as a complementary resource.
<b>Assessment Methods and criteria</b>	A written closed-book test (60%) and a coursework assignment(40%). The assignment consists in checking the compliance of the design of a building with the regulation(REH) requirements and its energy rating.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Project
<b>Course unit code</b>	908936
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	7
<b>Name of Lecturer(s)</b>	Cristina Margarida Rodrigues Costa Anabela Mendes Moreira
<b>Learning outcomes of the course unit</b>	The students should be able to develop, systematise and apply technical and scientific skills acquired in the programme of study by designing a reinforced concrete structure and analysing a complete construction project. This module is mainly based upon those of Structures and Constructions.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Knowledge of: Struct. I & II, Concrete I a& II, Foundations, Building Mat. I & II; Gener. Build. Processes. I & II, On-Site Manag. and Build. Physics
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	Design and pre-design of a concrete structure; Analysis and design of a structural system; Design of a structural project; Project measurements; Plan and Budget; Construction site planning; Health and Safety Plan; Construction and Demolition Waste Control and Management Plan; Acoustic compliance check.
<b>Recommended or required Reading</b>	- Vários autores, <i>Apontamentos e bibliografia das várias UC's do plano do Curso.</i> .: . - Vários autores, <i>Regulamentação e normas: RSA, REBAP.</i> : - Moreira, A. e Costa, C. <i>Slides e apontamentos de apoio fornecidos nas aulas de projeto..</i> :
<b>Planned learning activities and teaching methods</b>	Practical assignments related with project and analysis of a common concrete building with the supervision of the lecturers in charge of the modules Structures and Constructions.
<b>Assessment Methods and criteria</b>	Final grade is the arithmetic average of all the marks obtained in the modules Structures and Constructions. Submission of all assignments prescribed for the two modules within the deadlines is mandatory.
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.



## B - Description of individual course units

<b>Course unit title</b>	Regional and Urban Planning
<b>Course unit code</b>	908935
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Inês Domingues Serrano
<b>Learning outcomes of the course unit</b>	Students should learn key concepts and terminology related with land management and urban planning. They should gain a critical mindset about current urban plans and develop work directed at diagnosing and solving related problems.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	1.URBANISM The concepts of urban and urbanism, land planning and management. The European urban Experiences of the nineteenth and twentieth centuries. 2. LAND DEVELOPMENT Land planning and management 2.2 Land management tools 2.3 RJGT 2.4 RJUE 3. URBAN PLANNING 3.1 Urban space elements 3.2 Urban parameters and ratios 3.3 Rules and regulations 3.4 Urbanization plans and projects
<b>Recommended or required Reading</b>	- Hall, P.(2002). <i>Cities of tomorrow: an intellectual history of urban planning and design in the twentieth century</i> . Oxford: Blackwell - Lamas, J.(1993). <i>Morfologia Urbana e Desenho da Cidade</i> . Lisboa: FCG - Lamas, M. e Correia, P. e Pardal, S. (1995). <i>Normas Urbanísticas: Princípios e Conceitos Fundamentais</i> . Lisboa: DGOTDU-UTL - Portas, N. e Domingues, Á. e Cabral, J. (2004). <i>Políticas Urbanas, Tendências, estratégias e oportunidades</i> . Lisboa: FCG
<b>Planned learning activities and teaching methods</b>	Lectures focusing on the explanation of concepts and applicable legislation. Tutorials including practical exercises.
<b>Assessment Methods and criteria</b>	Two group assignments (mandatory to be eligible to take the exam) Written Test
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Road Engineering
<b>Course unit code</b>	908931
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	5
<b>Name of Lecturer(s)</b>	Fernando Manuel Lino Gonçalves Antunes
<b>Learning outcomes of the course unit</b>	Basic knowledge of ??design and construction of roads, road geotechnics, traffic analysis, geometric layout, calculation of land volumes and earthworks, drainage and paving.Students will be able to analyse and draw up a project and follow minor roadworks.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Soil Mechanics 1 and 2, Surveying and Physics
<b>Recommended optional programme componentes</b>	Not applicable.
<b>Course contentes</b>	An overview of road projects. Traffic Analysis.Traffic conditions. Track alignment. Longitudinal road profiles. Consistent road profiles. Transversal road profiles. Earthworks. Road Geotechnics. Road paving. Road drainage.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Branco, F. e Santos, L. (1999). <i>Vias de Comunicação</i>. (Vol. I). Coimbra: Departamento de Engenharia Civil, FCTUC</li> <li>- JAE, -. (1994). <i>Normas de Traçado</i>. (Vol. -). Almada: Junta Autónoma de Estradas</li> <li>- Branco, F. e Santos, L. e Capitão, S. (1998). <i>Vias de Comunicação</i>. (Vol. II). Coimbra: Departamento de Engenharia Civil, FCTUC</li> <li>- Santos, L. e Pereira, P. e Branco, F. <i>Pavimentos rodoviários</i>. (Vol. -). Coimbra: Almedina</li> </ul>
<b>Planned learning activities and teaching methods</b>	Lectures supported by exercises. Technical road project. Field trips.
<b>Assessment Methods and criteria</b>	Ongoing assessment: compulsory assignment: design of a road between 1 and 2 km long. Pass requirement: minimum 2.5 in the theoretical part of module. Exam assessment: written test (75%) Practical assignment: (25%)
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

## B - Description of individual course units

<b>Course unit title</b>	Steel and Composite Structures
<b>Course unit code</b>	908932
<b>Type of course unit</b>	Compulsory
<b>Level of Course unit</b>	First Cycle
<b>Year of Study</b>	Third Year
<b>Semester/Trimester when the course unit is delivered</b>	Second Semester
<b>Number of ECTS credits allocated</b>	4
<b>Name of Lecturer(s)</b>	Cristina Margarida Rodrigues Costa
<b>Learning outcomes of the course unit</b>	It is intended that students be able to apply knowledge of strength of materials, analysis, stability and design of structures, as well as the concepts of the regulation (RSA, REAE, EC1, EC3 and EC4) to the design of steel and composite structures.
<b>Mode of delivery</b>	Face-to-face
<b>Prerequisites and co-requisites</b>	Not applicable.
<b>Recommended optional programme components</b>	Not applicable.
<b>Course contentes</b>	1. INTRODUCTION. 2. STRUCTURAL ANALYSIS and CLASSIFICATION OF CROSS SECTIONS: elastic and plastic global analysis; P-delta effects; influence of joints; restraining. 3. DESIGN OF STEEL STRUCTURES: strength of cross sections; buckling; lateral and local buckling; joints and detailing. 4. STEEL-CONCRETE COMPOSITE STRUCTURES: steel-concrete connections; design of composite beams and slabs.
<b>Recommended or required Reading</b>	<ul style="list-style-type: none"> <li>- Vários Autores, <i>Regulamentos: RSA, REAE, EC1, EC3 e EC4</i>. (Edição: várias)</li> <li>- Da Silva, V.(2013). <i>Mecânica e resistência dos materiais</i>. Coimbra: Zuari</li> <li>- Silva, L. e Santiago, A. (2003). <i>Manual de ligações metálicas</i>. Coimbra: CMM Press</li> <li>- Simões, R.(2005). <i>Manual de dimensionamento de estruturas metálicas</i>. Coimbra: CMM Press</li> </ul>
<b>Planned learning activities and teaching methods</b>	Theoretical lessons comprise presentation and discussion of theoretical concepts and discussion of practical examples. Practical assignments of analysis and design of steel and composite structures are proposed to students in the practical classes.
<b>Assessment Methods and criteria</b>	Assessment consists of a written exam (80%), with a minimum grade of 9 points out of 20 and a practical assignment (20%).
<b>Language of Instruction</b>	Portuguese   <b>Mentoring in English</b>
<b>Work placement(s)</b>	Not applicable.

