Polytechnic Institute of Viseu

Higher School of Technology and Management of Viseu

International Semesters for students

Academic year 2013/2014

Civil Engineering

Spring Semester

Semester Title	Civil Engineering	Semester	Spring
Person responsible	Paulo Costeira	E-mail address	pcosteira@estv.ipv.pt
Coordinator	Nuno Raposo	E-mail address	npraposo@estv.ipv.pt
Language of instruction	English	ECTS points	30

Course type	Course title	Name of the lecturer	ECTS points
Optional	Structural Concrete	Paulo Costeira	5
Optional	Energy Efficiency and Comfort in Buildings	Ricardo Almeida	5
Optional	Introduction to Hydraulics	Tiago Abreu	5
Optional	Steel Structures	Gilberto Rouxinol	5
Optional	Soil Mechanics	Nuno Raposo	5
Optional	Traffic Engineering	Luís Vasconcelos	5
Optional	Project	Nuno Raposo	10

Course title	**Structural Concrete**		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Paulo Costeira	E-mail address:	pcosteira@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	5	Hours per semester	65
Objectives of the course	The main objective of the course is to introduce the students to the design of reinforced concrete beams and columns. To attend successfully the course the following goals are required: concrete codes knowledge; knowledge of the properties and behavior of materials and of reinforced concrete structural elements; the ability to design reinforced concrete beams; the ability to ensure the safety of the structure under ultimate limit state of strength: axial force, bending, shear and torsion; the knowledge of the detailing requirements of reinforced concrete structures; the ability to evaluate and quantify the second order effects due to axial force (columns); the ability to design statically indeterminate reinforced concrete structures (beams and frames); and the ability to elaborate drawings for the correct construction of the designed elements.		
Entry requirements	None.		
Course contents	1 – Structural Safety 2 – Materials Properties 3 – Ultimate Limit State. Axial Force and Bending. 4 – Durability and Detailing Requirements 5 – Shear 6 – Torsion 7 – Design of RC Beams 8 – Column Design		
Assessment methods	The continued evaluation consists in the resolution of proposed problems to be solved by students outside the classes and this is the criterion for admission to evaluation by a written final exam. The performance on these exercises may be taken into account in the final grade. There shall be a minimum value of attendance, representing 75% of classes. The exam consists of a written individual test, with 2 parts. The approval is obtained with a final grade greater than or equal to 10 and a minimum of 1.5 values in Theoretical Part (5 val.) and a minimum of 7 values in Practical Part (15 val.).		
Recommended readings	Barros, H., Figueiras, J.A., "Tabelas e ábacos de dimensionamento de secções de betão solicitadas à flexão e a esforços axiais segundo o eurocódigo 2", FEUP edições, 2010. EN 1990 "Eurocode: Basis of structural design". EN 1992-1-1 "Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings". Mosley, B., Bungey, J., Hulse, R., "Reinforced Concrete Design to Eurocode 2", Palgrave Macmillan, 2007. CEB - Comite Euro-International du Beton, "CEB-FIP Model Code 1990", Thomas Telford Services Ltd., ISBN 0-7277-1696-4, 1991. Nilson, A. H., Darwin, D., Dolan, C.W., "Design of concrete structures", 13.ª Ed., Mcgraw-Hill, ISBN: 007-123260-5, 2004.		
Additional information			

Course title	**Energy Efficiency and Comfort in Buildings**		
Teaching method	Classes (theoretical and or practical)		
Person responsible for the course	Ricardo Almeida	E-mail address:	ralmeida@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	4,5	Hours per semester	58,5
Objectives of the course	The energy efficiency of buildings is of extreme importance nowadays, which justifies a course that addresses the physical phenomena of heat, air and moisture transfer, thermal comfort of the users, the models and the regulations and standards related to the energy efficiency and comfort in buildings. This course aims to provide the theoretical bases for a detailed analysis of the hygrothermal behaviour of buildings and it is intended that students are qualified to perform computer simulations of energy performance and comfort in buildings.		
Entry requirements	None		
Course contents	Thermal comfort models: classical models based on thermal indices; adaptive models. Thermal and hygrothermal models for performance evaluation of a component, a zone and a building (1d, 2d and 3d). Advanced heat, air and moisture transfer analysis (HAM models). Building simulation.		
Assessment methods	To pass the course students must obtain a final mark greater than or equal to 10 on a scale of 0 to 20, calculated with the following formula: Final mark = 0.60 x Written exam+ 0.40 x Coursework (project) This formula is valid for all evaluation periods. Additionally, the minimum marks required for approval in the course are as follows: - Written exam: 50%; - Coursework (project): 50%.		
Recommended readings	H. Hens, "Building physics: Heat, air and moisture: Fundamentals and engineering methods with examples and exercises", Ernst & Sohn, 2007. F. Nicol, "Standards for thermal comfort: Indoor air temperature standards for the 21st century", Taylor Francis, 2006. Ansi/Ashrae Standard 55-2010. Thermal Environmental Conditions for Human Occupancy. ASHRAE, Atlanta, USA. ISO 7730 - Ergonomics of the Thermal Environment, Analytical Determination and Interpretation of Thermal Comfort using Calculation of the PMV and PPD Indices and Local Thermal Comfort Criteria. ISO, Genève, Switzerland, 2005.		
Additional information			

Course title	**Introduction to Hydraulics**		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Tiago Abreu	E-mail address:	tabreu@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	4,5	Hours per semester	58,5
Objectives of the course	The main objective of the course is to introduce the students to the basic concepts of Hydraulics. After attending this course students should be able to: know the physical properties of fluids and solve problems presented in different systems of units; calculate the buoyancy forces due to resting fluids; draw the hydraulic grade line and the energy line in hydraulic circuits; calculate the forces exerted by drainage in mooring massifs; calculate the lost loads of a determined system using the different uniform disposals rules..		
Entry requirements	None.		
Course contents	1 – Fluids' physical properties 2 – Fluid statics Equilibrium of a Fluid Element. Hydrostatic Pressure. Manometry. Hydrostatic Forces on Submerged Objects. Hydrostatic Forces in Layered Fluids. Buoyancy. Stability of Submerged and Floating Bodies 3 – Hydrocinematics Hydraulic grade line and energy line in hydraulic circuits. Inviscid Flows. Mass Conservation. 4 – Concepts and fundamental principles of hydrodynamics. Conservation of Energy. Bernoulli Equation. Conservation of Momentum. Laminar and turbulent flows. Major and minor losses. 5 – General study of liquid drainages. Integral relations for a control volume. Euler's theorem. 6 – Uniform drainage resistance rules.		
Assessment methods	The evaluation will consist of a final written test and continuous assessment. Students are expected to have an active participation in classes. Therefore, there shall be a minimum value of attendance, representing 75% of classes.		
Recommended readings	Fluid mechanics - Frank M. White, Mcgraw-Hill, 1999 Hydraulics - Andrew L. Simon, Scott F. Korom, Prentice Hall, 1997 Mechanics of fluids - Merle C. Potter and David C. Wiggert, Midhat Handzo, Prentice Hall, 1997		
Additional information			

Course title	**Steel Structures**		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Gilberto Rouxinol	E-mail address:	rouxinol@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	4,5	Hours per semester	58,5
Objectives of the course	Identify the various phenomena related with the steel structures. Perform safety checks and sizing of steel structures taking into account the regulatory requirements, including those recommended in the EC3. Scale welded and bolted connections.		
Entry requirements	None.		
Course contents	Materials. Basis of design. Structural analysis. Cross sections. Design of cross sections in tension and bending. Design of axially compressed members. Buckling resistance of members. Shear buckling. Design bending and axial compression members. Joint and connections.		
Assessment methods	The evaluation will consist of a final written test and continuous assessment. Students are expected to have an active participation in classes. Therefore, there shall be a minimum value of attendance, representing 75% of classes.		
Recommended readings	EN 1990 Eurocode : Basis of Structural Design EN 1991 Eurocode 1: Actions on Structures EN 1993 Eurocode 3: Design of Steel Structures Design of Steel Structures – Luís Simões da Silva, et. al., ECCS Editorial Board		
Additional information			

Course title	**Soil Mechanics**		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Nuno Raposo	E-mail address:	npraposo@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	4,5	Hours per semester	58,5
Objectives of the course	The main objective of the course is to introduce the students to the basic concepts of the soils mechanics. After attending this course students should be able to: identify and classify any given soil; determine the initial stresses in the soil and stresses induced by external forces; draw seepage networks; identify possible areas where hydraulic instability might occur, understand the consolidation processes and determine settlements due to consolidation; and evaluate the strength of a soil sample based on triaxial and shear tests.		
Entry requirements	None.		
Course contents	1 – Index Properties of Soils 2 – Stresses in Soils 3 – Hydraulic Properties of soils and Seepage 4 – Compressibility and Consolidation of confined layers of soil 5 - Stress, strain, and failure in soils		
Assessment methods	The evaluation will consist of a final written test and continuous assessment. Students are expected to have an active participation in classes. Therefore, there shall be a minimum value of attendance, representing 75% of classes.		
Recommended readings	Soil Mechanics - T. william Lambe & Robert V. Whitman, SI version, John Wiley & Sons, 1969 Engineering Properties of Soils And Their Mesurement - Joseph E. Bowles, McGraw-Hill Physical and Geotechnical Properties of Soils - Joseph E. Bowles, McGraw-Hill Soil Mechanics - John N. Cernica, John Wiley & Sons		
Additional information			

Course title	**Traffic Engineering**		
Teaching method	Classes (theoretical and or practical).		
Person responsible for the course	Luís Vasconcelos	E-mail address:	vasconcelos@estv.ipv.pt
Language of instruction	English	ECTS points	5
Semester	Spring	Type of course	Optional
Hours per week	4,5	Hours per semester	58,5
Objectives of the course	To endow students with the necessary knowledge to the definition of the following actions in the field of traffic engineering: analysis and definition of road networks; analysis of the performance and integrated project of intersections (roundabouts, traffic lights and priority junctions); integrated analysis of the subsystems: road, pedestrian and parking; modelling and analysis of the performance of road networks using computerized models.		
Entry requirements	None.		
Course contents	PRINCIPLES OF ROAD HIERARCHY: Functions of urban roads. Principles of hierarchy. Characteristics of collector roads, major distributors, local distributors and local access. Influence of spatial organization of cities. PRIORITY JUNCTIONS: Geometric design rules. Data collection. Methods of assessment of capacities - HCM method. ROUNDABOUTS: Introduction. Background and applicability of roundabouts. Geometric design rules. Capacity assessment. TRAFFIC LIGHTS: Basic concepts: phase, cycle, signal sequence, saturation flow and capacity of an entry. Models of delays. Choice of phases. Method of Webster. Method of critical paths. PARKING: Introduction. Management policies of the parking spaces. Assessment of supply and location of parks. Data collection. TRAFFIC ASSIGNMENT AND SIMULATION MODELS: The four steps. Principles of traffic assignment: shortest path, speed-flow curves, Wardrop equilibrium. Traffic assignment models.		
Assessment methods	The evaluation will consist of a final written test and continuous assessment. Students are expected to have an active participation in classes. Therefore, there shall be a minimum value of attendance, representing 75% of classes.		
Recommended readings	– TRB, HCM 2010: Highway Capacity Manual, Transportation Research Board, Washington, D.C., 2010. – Traffic engineering design: principles and practice/ Mike Slinn, Paul Matthews, Peter Guest . 2nd ed. - Amsterdam: Elsevier, 2005 (CDU 625.7/.8; 656.05) – Traffic engineering/ Roger P. Roess, Elena S. Prassas, William R. McShane . - 3rd ed . New Jersey: Pearson Education (CDU 625.7/.8; 656.05) – Guide to Traffic Engineering Practice/ Austroads - Sydney: Austroads (CDU 625.7/.8; 656.05)		
Additional information			

Course title	**Project**		
Teaching method	Tutorship orientation		
Person responsible for the course	Nuno Raposo	E-mail address:	npraposo@estv.ipv.pt
Language of instruction	English	ECTS points	10
Semester	Spring	Type of course	Optional
Hours per week	1	Hours per semester	13
Objectives of the course	The main objective of the course is the completion of a technical or scientific project. Students will develop the project individually, and in the end present and discuss it in a public session. The course is coordinated by the responsible professor and has the collaboration of several professors who will supervise the development of the project. The subject of the project can be chosen within the different areas of civil engineering. Student's supervisor should monitor the project with ongoing dialogues. The fulfillment of this course allows the development of student's ability to research, to solve practical problems, to write scientific texts and to communicate in public, by encouraging their participation in scientific and experimental activities.		
Entry requirements	None.		
Course contents	The projects will be developed within the area selected by the student, and can be of two natures: research or design.		
Assessment methods	Students will present and discuss their project it in a public session and the final grade will be decided by the jury.		
Recommended readings			
Additional information			