

Course unit title	ADVANCED DESIGN OF GLASS STRUCTURES
Course unit code	1E5
Type of course unit	Elective
Semester	1
Number of ECTS credits allocated	5
Name of lecturer(s)	Eliasova (CTU); Lecturer (UC); Lecturer (UNINA); Dubina/Ungureanu(UPT); Jaspert (ULg); Axelsson (LTU); (Associate 1) (Associate2).
Learning outcomes of the course unit	<p>Aim</p> <p>The course is intending to introduce the students the field of structural applications of glass and to give them some specific skills for calculation and detailing of for basic glass structures: panes beams and fins, columns and walls, point-supported glass, as well as for glazing systems such as glass facades, canopies and roofs, stairs and floors. On this purpose the properties of glass as structural material will be presented in comparison with other basic building materials, together with selected examples of glass/glazing applications. Design details and connecting technology, relevant technical regulations, specification and current methods applied in design will be described. Worked examples will accompany the lectures for better understanding, and design project will help to fix specific knowledge.</p> <p>Skills</p> <p>The course is conceived in order to give students the following skills:</p> <ul style="list-style-type: none"> - Understanding use of glass as structural material in specific application in buildings - Understanding the basic philosophy glass behaviour and use technical regulations and design specification for glass structure calculation and design - Understanding specific features of connecting and supporting systems, and detailing used in glazing - Applying FE analysis in structural glass design and interpretation of results.
Mode of delivery	Frontal lesson, seminars with worked examples, home works, design projects

Prerequisites and co-requisites	i.e. general admission requirements
Course contents	<p>The course contents covers the following topics:</p> <ol style="list-style-type: none"> I. Glass as a structural material II. Basis of design of structural glass III. Design of structural glass: strength and loadbearing behaviour of glass members IV. Glazing: Structural glass systems; connecting and supporting technology V. Robustness of glass structures VI. Sustainable design
Recommended or required reading	<p>ISTRUCTE: Structural use of Glass in building, The Inst. Of Structural Engineers, London, 1999.</p> <p>R. Nijsee: Glass in Structures, Birkhauser, Basel, Berlin, Boston, 2003.</p> <p>C. Schittich et al. Glass construction manual, Bikhauser. Basel, Boston, Berlin, 1999.</p> <p>Rice P., Dutton H., Structural glass , E&FN Spon m London, 1990</p> <p>pr EN13474-1: Glass in building-Design of panes-Part 1:General basis of design</p> <p>pr EN 1374-2: Glass in building-Design of panes-Part 2: design for uniformly distributed loads</p> <p>ASTM-E-1300-02: Standard Practice for determining Load Resistance of Glass in Buildings</p>
Planned learning activities and teaching methods	<p>Course content</p> <p>The course is conceived for 12 weeks:</p> <ol style="list-style-type: none"> 1- Structural glass applications in building 2 –Glass as structural material Types of glass; Structural and non-structural properties. Annealed glass; toughened glass; heat-strengthened glass; laminated glass. Insulated glass. Fire resistant glass. Photovoltaic Glass. 3- Basis of design Principles. Design requirements. Actions and Combinations. Design criteria for ULS and SLS, Design methods: calculation and design assisted by testing Standards and design specifications. 4- Design of structural glass members: Panes, beams and fins, columns, walls , point-supported glass



	<p>5. Connecting and supporting of glass : design detailing and technology</p> <p>6 Glazing systems Glass facades, canopies and roofs, floors, stairs, bridges, glass balustrades. Glass in large deflection structures.</p> <p>7. Robustness of glass structures Blast resistant glass; shock and bullet resistant glass; seismic action.</p> <p>8 Glazing for sustainable design</p> <p>Applications The applications are done under the form of practical applications and project: Worked examples:</p> <ul style="list-style-type: none"> - Pane calculation under different loading and supporting conditions - Beam and column design checking <p>Project (elective):</p> <ul style="list-style-type: none"> - Glass facade - Canopy - Stair
<p>Assessment methods and criteria</p>	<p>Approved assignments will be necessary to prepare at the end of the course on the work performed during the course. Defence of project. Grading system. Passed or not passed. A certificate awarding ECCS credits may be provided upon the request.</p>
<p>Language of instruction</p>	<p>English</p>