Course Unit Descriptor

Study Programme: Civil Engineering

Course Unit Title: Steel structures 1

Course Unit Code: GG27

Name of Lecturer(s): Jovanović Đorđe, Vukobratović Vladimir

Type and Level of Studies: bachelor

Course Status (compulsory/elective): elective

Semester (winter/ summer): summer

Language of instruction: english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 6

Prerequisites: none

Course Aims:.

Acquiring advanced academic and professional knowledge in the field of the design and detailing of steel structures according to limit states and enabling students to design and detail steel members and joints.

Learning Outcomes:

Students possess advanced academic and professional knowledge in the field of the design and detailing of steel structures according to limit states. They are able to solve problems of different levels of complexity on their own, as well as in communication and interaction with others. They are entrepreneurial and can lead projects of different complexity by respecting the ethical standards of their profession. They have a positive attitude towards lifelong learning and personal and professional development.

Syllabus.

Introduction to the program and work organization on the course. Basic steel material properties. Steel grades. Structural steel. Steel material designation. Selection of base material. Calculation of cross-sectional resistance due to axial forces, bending moments and shear forces. Buckling of compressive members (flexural, torsional and torsional-flexural). Elastic critical forces, buckling lengths, buckling curves. Uniform members in bending. Cross-section design resistance for interaction of bending and shear. Lateral torsional buckling of members, elastic critical moment for lateral-torsional buckling. Cross-section design resistance for interaction (axial force + bending moment, axial force + shear force + bending moment). Stability of eccentrically loaded members (interaction of buckling, bending and lateral torsional buckling). Bolts (shapes and dimensions, designation and strength classes). Calculation of bolts' resistance (shear, bearing, tension and combined stress). Rules for detailing of joints with mechanical fasteners. High strength bolts. Calculation of bolts' resistance (slip, tension and combined stress). Welding (basic terms and definitions, welding procedures, types of welds and designation). Calculation of design resistance of fillet and butt welds. Calculation and detailing of splices of axially loaded members and girders. Design of nominally pinned joints. Calculation and detailing of moment-resisting joints. Lattice girders - types, shapes, dimensions, detailing. Lattice girders - detailing and calculation of joints. Lattice girders made from hollow section profiles - detailing and calculation of joints' resistance.

Required Reading:

Relevant literature in English, tbd

Weekly Contact Hours:2	**Lectures: 3**	**Practical work: 3**

Teaching Methods:

Lectures, practical classes, consultations. The theoretical part of the study material is presented at lectures through presentations of individual thematic units, followed by the appropriate examples from engineering practice for the sake of easier perceiving and understanding. At practical classes, the study material is processed through the solving of practical problems with the active participation of students. In addition to lectures and exercises, consultations are held regularly in order to provide students with answers to additional questions related to the study material.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			

Tests (4x)			