Course Unit Descriptor

Study Programme: Civil Engineering

Course Unit Title: Stability and Dynamics of Structures

Course Unit Code: GG29

Name of Lecturer(s): Kovačević Dušan

Type and Level of Studies: bachelor

Course Status (compulsory/elective): elective

Semester (winter/ summer): winter

Language of instruction: english

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

Number of ECTS Allocated: 5

Prerequisites: none

Course Aims:.

Acquiring primary knowledge in modelling and analysis of geometric nonlinear behavior of structures and the behavior of structures for dynamic actions.

Learning Outcomes:
Enabling competence for modelling and analysis geometric nonlinear behavior of structures and the behavior of structures for dynamic actions.

Syllabus.
Geometric, static and material nonlinearity. Theory of first and second order. Definition of stability. Bifurcation theory. Linear theory of first and second order. Eule's cases of buckling. Buckling length. Differential equation of bending of rod. Evaluation of rod stability parameters. Stability of rod systems. Displacement method. Modelling the nonlinear structure behavior. Finite element method. Dynamic load action. Dynamic model of structure. Differential equations on system motion with one or more degrees of freedom. Free and forced vibrations of the system with one degree of freedom with and without damping. Free and forced vibrations of system with more degrees of freedom. Earthquake action and structural response. Method of analysis structures for seismic action. Principles of aseismic design of buildings.

Required Reading:
Relevant literature in English, tbd

Weekly Contact Hours:2	**Lectures: 3**	**Practical work: 1**

Teaching Methods:
Interactive work with students in order to continually monitor their knowledge level. Theoretical analysis on the phenomena included in the course content and numerical modelling.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			