

<b>Study Programme: Civil Engineering</b>			
<b>Course Unit Title: Theory of Structures - roads</b>			
<b>Course Unit Code: GG26H</b>			
<b>Name of Lecturer(s): Rašeta Andrija, Džolev Igor, Radujković Aleksandra</b>			
<b>Type and Level of Studies: bachelor</b>			
<b>Course Status (compulsory/elective): elective</b>			
<b>Semester (winter/ summer): summer</b>			
<b>Language of instruction: english</b>			
<b>Mode of course unit delivery (face-to-face/distance learning): face-to-face</b>			
<b>Number of ECTS Allocated: 6</b>			
<b>Prerequisites: none</b>			
<b>Course Aims:</b> Acquiring knowledge necessary for the analysis static indeterminate structures due to permanent load and solving the problem of bifurcation stability.			
<b>Learning Outcomes:</b> Ability to calculate and analyze frame structures that are used in the construction industry exposed to static actions and solve the problem of bifurcation stability. The acquired knowledge is used in professional subjects that follow and in engineering practice.			
<b>Syllabus.</b> An overview of the basic equations of the linear beam theory. Statically indeterminate structural systems. Force method: basic determinate structure, forming and solving governing equations. Special static indeterminate systems: beams fixed at one and both ends, continuous beams, two hinged frame, fixed frame, truss systems. Beams on elastic foundation. Impact of moving load. Construction of influence lines for forces and displacements at cross sections. Displacement method: basic principles and unknowns. Plane structural systems: beam stiffness matrix, reaction vector, transformation matrix, boundary conditions, governing equations, force calculations at beam ends. Second order theory. Differential equation and its solution. Analysis of elastic stability of systems composed of line elements. Bifurcation stability. Basics of the structural dynamics. Discrete systems composed of line elements. Linear systems with one (single) and more (multi) degrees of freedom of movement. Free and forced undamped and damped vibrations: harmonic force, suddenly applied force, impulse, arbitrarily variable force. Numerical integration. Modal superposition and direct Integration. Application of structural analysis software.			
<b>Required Reading:</b> Relevant literature in English, tbd			
<b>Weekly Contact Hours:2</b>	<b>Lectures: 3</b>	<b>Practical work: 2</b>	
<b>Teaching Methods:</b> Lectures, numerical-graphic practice, consultations. Exercises are carried out by groups according to a program that fully follows the material from the lectures. The condition for entering the exam is positively assessed individual tasks.			
<b>Knowledge Assessment (maximum of 100 points):</b>			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Attendance			
Computer exercises			
Tests (4x)			

