

Study program:	Civil Engineering		
Level of study:	Undergraduate academic studies		
Course title:	Matrix analysis of structures		
Teacher:	Vojnić Purčar Martina		
Course Status:	Compulsory		
Credits (ECTS):	5		
Prerequisite:	Theory of line structures 1		
Course objective(s):	Introduction to modern (matrix) calculation methods of engineering constructions, suitable for use on computers.		
Course outcome(s):	The realization of the planned scopes.		
Course Content:			
1 st week	Opening remarks. Basic assumptions of linear theory. Overview of technical beam bending theory equations. Calculation of the point displacement of the elastic line of the rod. Deformation independent values of rod.		
2 nd week	Strain indeterminacy of girder in exact deformation method. Deformational determined and statically equivalent system. The concept of stiffness matrix and matrix of flexibility.		
3 rd week	Matrix analysis of rod. Basic static and kinematic values. Matrix stiffness and vector of equivalent nodal loads and direct method of their formation.		
4 th week	Forming stiffness matrix and vector of equivalent nodal loads for rods exposed to axial stress, bending in plane, torsion and complex stress. Base stiffness matrix - part -1.		
5 th week	Forming stiffness matrix and vector of equivalent nodal loads for rods exposed to axial stress, bending in plane, torsion and complex stress. Base stiffness matrix - part -2.		
6 th week	Forming stiffness matrix and vector of equivalent nodal loads for rods exposed to axial stress, bending in plane, torsion and complex stress. Base stiffness matrix - part -2.		
7 th week	First colloquium.		
8 th week	Matrix analysis on system of rods. Matrix of transformation of straight girders. System equations. Contour conditions. Determinating joint displacement and the reactions of the supports. Directly forming of system equations – Part 1.		
9 th week	Matrix analysis on system of rods. Matrix of transformation of straight girders. System equations. Contour conditions. Determinating joint displacement and the reactions of the supports. Directly forming of system equations – Part 2.		
10 th week	Matrix analysis on system of rods. Matrix of transformation of straight girders. System equations. Contour conditions. Determinating joint displacement and the reactions of the supports. Directly forming of system equations – Part 3.		
11 th week	Second colloquium.		
12 th week	Orthogonal frames. Trusses. Continuous girders.		
13 th week	Symmetric girders. Spatial girders.		
14 th week	Grillage systems.		
15 th week	Third colloquium.		
Literature:	M. Đurić: Teorija okvornih konstrukcija, Građevinska knjiga, Beograd, 1972. M. Sekulović: Teorija linijskih nosača, Građevinska knjiga, Beograd 2005.		
Number of hours:			
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Individual research work: 0
			Other classes: 0
Teaching methods:	Lectures, exercises, seminars, consultations		
Evaluation of knowledge (maximum 100 points)			
Pre-exam activities	points	Final exam	points
Activity during the lectures	10	Written exam	20
Activity during the exercises	10	Oral exam	15
Colloquia	45		