„DZEMAL BIJEDIC“ UNIVERSITY OF MOSTAR FACULTY OF CIVIL ENGINEERING		
Unit:	**Structural Stability**	**Subject code: 0000**
Level:	Graduate	
Professor:	Associate Professor dr.sc. Mili Selimotić, CE	
Contact details:	E-mail: mili.selimotic@unmo.ba	Tel: +387 36 514-866
Contact hours:	Lectures per week: 2hrs	Practicals/tutorials per week: 2hrs
ECTS:	6 ECTS	
Unit status:	Core	
Prerequisites:	-	
Synopsis:	Deformable systems. First, Second and Third order theory – corresponding hypotheses. Introduction to geometrical nonlinearity. Differential equations of the nonlinear problem – forms and assumptions. Problem of elastic stability. Principle of stationary potential energy. Loss of stability of the form of equilibrium in deformed state – bifurcation. Approximate stability analysis for the straight strut – Euler's problem. Buckling of a perfectly straight and centrically loaded strut for different boundary conditions. Critical load (buckling load) and corresponding buckling (instability) modes. Critical stress and slenderness ratio. Real behaviour of struts: struts with an initial curvature and eccentrically loaded struts. Approximate methods for determining the critical load: methods based on the energy principle and finite difference method. Stability of frames (systems with rigidly connected struts): stiffness matrix and its singularity; formation of the stiffness matrix; critical load factor and linearization of the problem through a doubly iterative process. Critical load versus ultimate limit load. Stability of plane trusses: formation of the corresponding stiffness matrix and main differences comparing to frames. Stability of arches: specifics of the analysis, governing differential equations and their solution for some types of circular arches with hydrostatic load.	
Aims:	Extension of basic principles acquired in undergraduate Structural Analysis I and II courses in order to be able to analyze the behaviour of complex planar and spatial systems containing lineal structural members. Introducing students to the fundamental analysis of lineal structural members and systems based on the geometrical nonlinearity and the Second order theory.	
Outcomes	On successful completion of the course, students should understand the challenges related to the analysis of lineal structural members and systems based on the geometrical nonlinearity and the Second order theory and be able to apply acquired concepts in structural design of such systems.	
Teaching methods:	Lectures, practicals/tutorials/self-directed learning exercises	
Assessment:	Final examination (2 hours): 100%;	
Prescribed literature:	1. R.C. Coates, M.G. Coutie, F.K. Kong, Structural Analysis 3rd edition, Chapman & Hall, 1992. 2. Jokanović O., Geometrijska nelinearnost i stabilnost linijskih konstrukcija-skripta Građevinski fakultet u Sarajevu. 3. Lecture notes	