„DZEMAL BIJEDIC“ UNIVERSITY OF MOSTAR FACULTY OF CIVIL ENGINEERING		
Unit:	**Mechanics of materials I**	**Subject code: 0000**
Level:	Undergraduate	
Professor:	Associate Professor dr.sc. Mili Selimotić, CE	
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Contact hours:	Lectures per week: 3hrs	Practicals/tutorials per week: 2hrs
ECTS:	6 ECTS	
Unit status:	Core	
Prerequisites:	-	
Synopsis:	Fundamental hypotheses of Mechanics of materials. Concept of stress at a point in an arbitrarily loaded body. General state of stress at a point. Stress tensor and its components. Principal stresses and corresponding planes. Two-dimensional or Plane stress. Mohr's circle for Plane stress. Analysis of strain – concepts and definitions. Displacement, deformation and the concept of strain. General state of strain at a point. Strain tensor, spherical (hydrostatic) and deviatoric strain. Principal strains and corresponding directions. Two-dimensional or Plane strain. Strain compatibility equations. Material properties and stress – strain relationships. Stress – strain diagrams. Elastic and plastic deformation. Generalized Hooke's law for homogeneous isotropic materials. Equivalent stress and material failure theories. Axial loading: Stresses and deformations in axially loaded members and systems of axially loaded members. Sizing of members. Statically determinate and indeterminate axially loaded members. Stresses caused by the change of temperature. Stress concentration. Flexural loading (bending) of beams: Basic assumptions. Flexural strains and stresses. The elastic flexure formula for normal stresses and corresponding equilibrium equations. Moments and products of inertia. The parallel axis theorems. Principal moments of inertia and principal directions. The shear stress formula and corresponding equilibrium equations. Shear stress distribution in cross sections of beams. Shear center. Principal stresses for elastic flexure and principal stress trajectories. Allowable stress and sizing of beams with transverse loading.
Aims:	Introducing students to principles and basic methods of stress analysis (stresses and strains) and dimensioning of lineal structural members (rods and beams) primarily in the area of elastic deformation in the case of axial and flexural loading. The analysis is limited to members made of homogeneous and isotropic materials. The course shall set the foundation for understanding concepts and applications that are subjects of other undergraduate as well as graduate level courses such as Concrete Structures, Steel Structures, etc.
Outcomes	On successful completion of the course, students should comprehend basic concepts, methods and applications of stress analysis and sizing of linearly elastic, homogeneous and isotropic structural members (rods and beams) in the case of axial and flexural loading and be capable of solving related simpler practical problems.
Teaching methods:	Lectures, practicals/tutorials/self-directed learning exercises
Assessment:	Two tests (1 hour each) 20% and 30%; Final examination (2 hours): 50%;
Prescribed literature:	1. Archie Higdon, Edward H. Ohlsen, William B. Stiles, John A. Weese, William F. Riley, Mechanics of materials, Fourth edition, John Wiley & Sons, Inc. 1985. 2. R.C. Hibbeler, Mechanics of materials, Second edition, Macmillan College Publishing Company, 1994. 3. Branislav Verbič, Otpornost materijala-skripta, Građevinski fakultet u Sarajevu