„DŽEMAL BIJEDIĆ“ UNIVERSITY OF MOSTAR FACULTY OF MECHANICAL ENGINEERING			
Course name:	**Dynamics and oscilations**		**Course code: 0000**
Cycle level, year, semester	Master degree		1st. academic year. / summer
Course teacher:	Assoc.prof. Emir Nezirić		
Contact:	Room: O007 E-mail: emir.neziric@unmo.ba Tel.:+38736571258		
Student workload in hours:	Lectures weekly: 2 hours	Excercises weekly: 2 hours	Total: (30+30)
Number of ECTS credits:	ECTS: 6		
Base qualification:	Master study level		
Course status:	Mandatory		
Preconditions for Course:	-		
Limitations for Course:	None		
ECTS explanation:	60 in class (lectures, auditory excercises, labratory excercises) / 25 = 2,4 ECTS 25 hours of homework / 25 = 1 ECTS 15 hours of reading / 25 = 0,6 ECTS 50 hours of examples solving (home) / 25 = 2 ECTS TOTAL = 6 ECTS		
Course goal:	The aim of the course is for students to learn how to determine the parameters of motion of rigid bodies using the laws of mechanics, analyzing the causes of motion, as well as describing oscillatory motion using equations along with its analysis.		
Description of the general and speciffic competences (knowledge and skills) / learning outcomes:	Upon successful completion of this course, students will be able to: - Formulate equations of motion for rigid bodies using D'Alembert's principle and solve them. - Formulate equations of motion for bodies with variable mass and solve them. - Formulate differential equations of motion for oscillatory systems (rectilinear oscillation of a point, rotational oscillation around a fixed point) and solve them. Equations of motion are set up using various methods. - Determine critical speeds of high-speed shafts using different methods. - Analyze the dynamic behavior of rotating machinery and describe potential issues.		
Course contents:	1. Dynamics of systems of particles and solid body. Moment of inertia. D'Alembert principle for material system. Differential equations of solid body motion. 2. Solid body basic laws of motion. Momentum and conservation of momentum of solid body. Kinetic energy of and solid body. Work-energy relation for solid body. 3. Gyroscopic motion. 4. Elementary analytical mechanics. Introduction to theory of linear vibrations of discreete systems, natural frequency and types of vibrations. 5. Rectilinear vibrations of particle. Stability of mechanical system. Free vibrations of material system with single degree of freedom (SDOF), pendulum, torsional vibrations. 6. Energy method for equation of motion determination. Lagrange's equations of second kind. 7. Damped vibrations of material system with SDOF. 8. Forced vibrations of material system with SDOF, resonance, beating. 9. Unbalance as harmonic force, (balancing of wheel, balancing of flywheel). 10. Vibrations of mechanical system with finite number of DOF. Generalized coordinates and degrees of freedom od system of particles. 11. Vibrations of continuum. Transversal vibrations of string. 12. Axial vibrations of prismatic beam (shock absorber). Torsional vibrations of circular beam (transmission shafts). Transfersal vibrations of prismatic beam and vibration of the plates (chassis, structures). 13. Critical speeds of shafts. Morley, Rayleigh and Dunkerley method.		
Form of teaching:	Lectures, auditory excercises, laboratory excercises		

Other student obligations:	-
Items of Assesment:	Two partial tests during semester (7th and 15th week). Final grade: Homework – 20%. Partial tests – 25%+25% = 50% Final exam – 30%
Base literature and references:	1. I. Karabegović: DINAMIKA,Svjetlost,Sarajevo, 1997. 2. V. Doleček: DINAMIKA, Mašinski fakultet Sarajevo, 2007. 3. V. Doleček, A. Voloder, S. Isić: Vibracije, Sarajevo 2009. 4. L. Rusov: Mehanika-Dinamika, Naučna knjiga Beograd, 1989. 4. J.L. 5. Meriam,L.G. Kraige: Engineering Mechanics_ Dynamycs, 1998. 6. S.P. Timošenko, D.H.Jang: Teorija oscilacija, Beograd 1966. 7. D. Rašković: Teorija oscilacija, Beograd, 1974. 8. L. Meirowitz: Fundamentals of vibrations, McGRaw-Hill, NY (USA), 2001. 9. C.F. Beards: Structural vibration: Analysis and damping, Halsted Press, NY, 1996.
Course quality measurement:	Anonymous survey