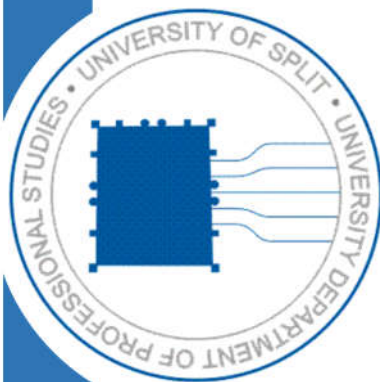


Course syllabus

Engineering Mechanics - Dynamics



COURSE DETAILS		
Type of study programme	Undergraduate professional study programme- 180 ECTS	
Study programme	MECHANICAL ENGINEERING	
Course title	Engineering Mechanics - Dynamics	
Course code	SKS010	
ECTS (Number of credits allocated)	7	
Course status	Core	
Year of study	First	
Course Web site	https://moodle.oss.unist.hr/course/category.php?id=21	
Total lesson hours per semester	Lectures	45
	Auditory exercises	45
Prerequisite(s)	None	
Lecturer(s)	Department of Mechanical Engineering: Ado Matoković, Ph.D., college professor,	

COURSE DESCRIPTION

Course Objectives:	<ul style="list-style-type: none"> Understanding basic laws and principles of plane kinematics and kinetics of particle and rigid body.
Learning outcomes On successful completion of this course, student should be able to:	<ol style="list-style-type: none"> define basic kinematic quantities of rectilinear and curvilinear motion of particle such as: position, displacement, velocity and acceleration, describe and understand plane kinematics of rigid bodies, explain basic terms in kinetics of particles: Newton's second law, work and kinetic energy, impulse and momentum, gravitational and elastic potential energy discuss direct and oblique central impact determine moments and products of inertia of a mass, explain plane kinetics of rigid bodies, analyse and comprehend free undamped and damped vibrations
Course content	<p>Introduction into Engineering Mechanics-Dynamics.</p> <p>Basic quantities and units. Newton's laws of motion and law of gravitation.</p> <p>Kinematics of particle. Rectilinear motion and basic kinematic quantities: position, displacement, velocity and acceleration. Special cases of rectilinear motion of particle: motion with constant velocity and motion with constant acceleration. Dependent rectilinear motions. Curvilinear motion of particle: position vector, velocity and acceleration. Free flight of a projectile. Tangential and normal components of acceleration. Radial and transvers components of velocity and acceleration. ,</p> <p>Kinetics of particles: force and acceleration. Newton's second law. D'Alembert's principle - dynamic equilibrium.</p> <p>Definition of work, kinetic energy and power. Work of a gravitational force. Work of a spring force. Principle of work and energy. Potential energy: gravitational and elastic.</p> <p>Impulse and momentum. Principle of impulse and momentum. Angular impulse and angular momentum.</p> <p>Impact: direct central impact; oblique central impact.</p> <p>Plane kinematics of rigid bodies. Types of plane motion of rigid bodies: translation, rotation, general plane motion. Velocity and acceleration centre. Accelerations in different reference frames. Interpretations for Coriolis acceleration.</p> <p>Plane kinetics of rigid bodies. Mass moments of inertia, parallel-axis theorem, calculation mass moments of inertia for composite bodies. Work and energy. Kinetic energy of a rigid body in plane motion. Principle of work and energy. Conservation of energy. Impulse and momentum. Principle of impulse and momentum.</p> <p>Vibrations. Undamped free vibrations. Damped free vibrations.</p>

CONSTRUCTIVE ALIGNMENT – Learning outcomes, teaching and assessment methods

Alignment of students activities with learning outcomes		
Activity	Student workload ECTS credits	Learning outcomes
<i>Lectures</i>	45 hours / 1,5 ECTS	1,2,3,4,5,6,7
<i>Auditory exercises</i>	45 hours / 1,5 ECTS	2,3,4,7
<i>Homework</i>	12 hours / 0,4 ECTS	2,3,4,7
<i>Short tests</i>	12 hours / 0,4 ECTS	2,3,4,7
<i>Self-study</i>	96 hours / 3,2 ECTS	1,2,3,4,5,6,7,8
TOTAL:	210 hours / 7 ECTS	1,2,3,4,5,6,7,8

CONTINUOUS ASSESSMENT		
Continuous testing indicators	Performance A_i (%)	Grade ratio k_i (%)
<i>Class attendance and participation</i>	70 - 100	10
<i>Seminars</i>	100	10
<i>Homework</i>	0-100	10
<i>Short tests</i>	0-100	10
<i>First mid-term exam</i>	50-100	30
<i>Second mid-term exam</i>	50-100	30

FINAL ASSESSMENT		
Testing indicators – final exam (first and second exam term)	Performance A_i (%)	Grade ratio k_i (%)
<i>Written exam</i>	50 - 100	45
<i>Oral exam</i>	50 - 100	45
<i>Seminars</i>	100	10
Testing indicators – makeup exam (third and fourth exam term)	Performance A_i (%)	Grade ratio k_i (%)
<i>Written exam</i>	50 - 100	45
<i>Oral exam</i>	50 - 100	45
<i>Seminars</i>	100	10

PERFORMANCE AND GRADE		
Percentage	Criteria	Grade
50% - 61%	<i>basic criteria met</i>	sufficient (2)
62% - 74%	<i>average performance with some errors</i>	good (3)
75% - 87%	<i>above average performance with minor errors</i>	very good (4)
88% - 100%	<i>outstanding performance</i>	outstanding (5)

ADDITIONAL INFORMATION

Teaching materials for students (scripts, exercise collections, examples of solved exercises), teaching record, detailed course syllabus, application of e-learning, current information and all other data are available by MOODLE system to all students.