

DEPARTMENT OF CIVIL ENGINEERING  
COURSE SYLLABUS

Course Details				
<b>Code</b>		<b>Academic Year</b>		<b>Semester</b>
BAU209		2		1
<b>Title</b>		<b>T</b>	<b>A</b>	<b>L</b>
Kinematics and Dynamics		3	1	1
<b>ECTS</b>		6		
<b>Language</b>	German			
<b>Level</b>	<b>Undergraduate</b>	✓	<b>Graduate</b>	<b>Postgraduate</b>
<b>Department / Program</b>	Civil Engineering			
<b>Forms of Teaching and Learning</b>	Formal			
<b>Course Type</b>	<b>Compulsory</b>	✓	<b>Elective</b>	
<b>Objectives</b>	This course aims to teach students the principles of kinematics and dynamics in civil engineering. It seeks to enable students to understand the applications of motion, forces, and energy in the context of civil engineering. Additionally, it aims to equip students with the competence to model and analyze the dynamic behavior of structures and construction systems. The course aims to develop students' abilities to perform engineering calculations and examine the kinematic motions of structural systems. Through this course, students will gain the ability to solve dynamic and kinematic problems encountered in civil engineering projects.			
<b>Content</b>	This course includes the principles of kinematics and dynamics in civil engineering. It covers the applications of motion, forces, and energy in engineering, as well as the dynamic behavior of structures. The course includes the processes of modeling and analyzing the kinematic motions of structures. Additionally, it encompasses the fundamental principles and methods for engineering calculations and dynamic analysis of structural systems. The course includes the competence to evaluate and solve the behavior of structures and construction systems under dynamic loads.			
<b>Prerequisites</b>	( BAU109 )			
<b>Coordinator</b>	Asist Prof.Dr. Merve Teke Budak			
<b>Lecturer(s)</b>	Asist Prof.Dr. Merve Teke Budak			
<b>Assistant(s)</b>				
<b>Work Placement</b>				
Recommended or Required Reading				
<b>Books / Lecture Notes</b>	Technische Mechanik 3 Kinetik , Autoren: Gross, D., Hauger, W., Schröder, J., Wall, W.A. ISBN 978-3-642-53954-1 ? Skripte in elektronischer Form vorhanden <a href="http://mechanik.tuberlin.de/">http://mechanik.tuberlin.de/</a>			
<b>Other Sources</b>				
Additional Course Material				
<b>Documents</b>				
<b>Assignments</b>				

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Exams			
<b>Course Composition</b>			
Mathematics und Basic Sciences	30		%
Engineering	30		%
Engineering Design			%
Social Sciences			%
Educational Sciences			%
Natural Sciences			%
Health Sciences			%
Expert Knowledge	40		%
<b>Assessment</b>			
Activity	Count	Percentage (%)	
Midterm Exam	1	40	
Quiz			
Assignments			
Attendance			
Recitations			
Projects			
Final Exam	1	60	
		<b>Total</b>	<b>100</b>
<b>ECTS Points and Work Load</b>			
Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	13	7	91
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	1	14
Laboratory	14	1	14
Projects			
Final Exam	1	4	4
		<b>Total Work Load</b>	<b>168</b>
		<b>ECTS Points (Total Work Load / Hour)</b>	<b>6 ECTS</b>
<b>Learning Outcomes</b>			
1	Students will be able to gain the ability to mathematically model the problems faced in dynamics and obtain sought solutions with a reasonable approximation.		

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2	Students will be able to understand basic principles of 2-D motion of systems of particles and rigid bodies.
3	Students will gain the ability to understand the basic principles of vibration analysis and to use them in practice.

**Weekly Content**

1	Fundamentals of kinematics the terms force
2	Torque
3	Work, performance, energy,
4	Power, energy, momentum, angular momentum
5	Set of center of gravity and twist set elastic and not elastic shocks
6	Set of center of gravity and twist set elastic and not elastic shocks
7	The movement of the rigid body (angular velocity, inertial tensor, basic concepts of gyro theory)
8	Midterm
9	The movement of the rigid body (angular velocity, inertial tensor, basic concepts of gyro theory)
10	The movement of the rigid body (angular velocity, inertial tensor, basic concepts of gyro theory)
11	Theory of vibrations (free and forced vibrations, damping, resonance)
12	Theory of vibrations (free and forced vibrations, damping, resonance)
13	Theory of vibrations (free and forced vibrations, damping, resonance)
14	Vibrations of systems with two degrees of freedom dynamic stability
15	Vibrations of systems with two degrees of freedom dynamic stability
16	Final Exam

**Contribution of Learning Outcomes to Program Objectives (1-5)**

	P1	P2	P3	P4	P5	P6	P7
1	4		4			4	
2	4						
3			4				

**Contribution Level** 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

**Compiled by:**

**Date of Compilation:**

26.02.2026