DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
BAU209	2			1
Title	**T**	**A**	**L**	**ECTS**
Kinamatics and Dynamics	3	1	1	6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	Students learn the basics of kinematics and dynamics. This basic mechanical knowledge is necessary for attending further courses in the Bachelor and Master studies. The knowledge imparted enables the students to further develop themselves later in their careers. The imparted theoretical knowledge enables the students to work on and solve practical engineering problems. Students can use the methods taught to model mechanical systems and assess the application limits of the derived models. The students are introduced to the basics of modeling. The imparted basic knowledge in mechanics enables students to recognize analogies to other subject areas and to apply this knowledge there as well.					
Content	First half of the semester: Dot mass: Kinematics and kinetics of the mass point, momentum set, energy set of the mechanics, angular momentum and moment set Dynamics of mass point systems Second half of the semester: Dynamics of the rigid body: movement of the rigid body (angular velocity, inertia tensor, basic terms of gyroscopic theory) Theory of vibrations: free and forced vibrations, damping, resonance Vibrations of systems with two degrees of freedom, dynamic stability					
Prerequisites						
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	Wolfgang H. Müller, Ferdinand Ferber: Technische Mechanik für Ingenieure, 4. neu bearbeitete Auflage, Carl Hanser Verlag
Other Sources	

Additional Course Material

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

Documents		
Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	2	50
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	5	70
Self-Study	14	3	42
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	10
Recitations			
Laboratory			
Projects			
Final Exam	1	2	15
		Total Work Load	**137**
		ECTS Points (Total Work Load / Hour)	**6 ECTS**

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

Learning Outcomes	
1	Learning the basics of kinematics and dynamics
2	Mechanical system modeling skills
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Weekly Content	
1	Kinematics of the mass point: basic concepts
2	Kinematics and kinetics of the mass point: basic terms
3	Kinetics of the mass point: basic concepts
4	Pulse set The energy theorem of mechanics Angular momentum and momentum Kinematics of mass point systems Kinetics of mass point systems
5	Exercise: 1-5
6	Pulse and center of gravity for mass point systems Angular momentum for mass point systems The energy and work set for mass point systems
7	An application of the momentum and energy theorem: Centric collisions between spherical masses Body with time-varying mass
8	Rigid body kinematics: basic concepts Rigid body kinematics in the rigid body kinetics plane: 3D movement around a fixed axis
9	Rigid body kinetics: any movement in the plane, rigid body systems
10	Intermediate Exam-I/Exercise: 6-10
11	Work set for rigid body movement in the plane Thematic conclusion of the rigid body movement; Vibrations: basic terms
12	Free undamped and damped vibrations with one degree of freedom
13	Intermediate exam-II/Exercise: 11-14
14	Thematic conclusion of the free damped vibrations with one degree of freedom Excited vibration with one degree of freedom

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

15	Excited vibrations with damping Vibrations with a finite number of degrees of freedom

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

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	