DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
MEC209	2			WiSe
Title	**T**	**A**	**L**	**ECTS**
Kinematics and Dynamics	3	1	1	6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Mechatronics Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	The following skills should be developed among the students of mechanics: Formation of a basic knowledge in mechanics, which facilitates and promotes the attendance of further courses in the bachelor and master studies. The basic knowledge in mechanics, which is to be taught in the basics, is to secure the professional ability, in order to enable further and new education during the entire professional life. However, the students' skills should not be confined to the theoretical penetration of mechanical problems, but also promote the ability to work through and solve concrete and practical engineering problems. The ability to verify own results and to clearly recognize the application limits of the used models is to be reached as a basis for the technical reliability of the trainee engineers. For this, a deeper understanding of the necessary base material of the mechanics must be achieved. Students are introduced to the basics of modeling. The basic knowledge in mechanics enables the students to recognize analogies to other subject areas and to apply this knowledge there as well.					
Content	**First half of the semester:** Fundamentals of kinematics the terms force, torque, work, power, energy, momentum, angular momentum **Second half of the semester:** The motion of the rigid body(angular velocity, inertial tensor, fundamental concepts of gyro theory) Theory of vibrations (free and forced vibrations, damping, resonance) Vibrations of systems with two degrees of freedom dynamic stability					
Prerequisites	a) Fundamentals of differential and integral calculus, statics and elementary strength of materials b) desirable: Knowledge of ordinary differential equations is desirable, but is also briefly introduced in the dynamic lectures.					
Coordinator	-					
Lecturer(s)	Dr. Merve Teke BUDAKLI					
Assistant(s)	M.Sc. Ali KORUCU					

DEPARTMENT OF MECHATRONIC ENGINEERING
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Work Placement	-
Recommended or Required Reading	
Books / Lecture Notes	Albrecht Bertram: Magdeburger Vorlesungen zur Technischen Mechanik Wolfgang H. Müller, Ferdinand Ferber, Technische Mechanik für Ingenieure, 4. Auflage, Hanser Verlag / Fachbuch Verlag Leipzig Technische Mechanik 3 Dynamik, Russell Charles Hibbeler, Pearson Engineering Mechanics: Dynamics, 8th Edition, James L. Meriam, L. G. Kraige, Jeffrey N. Bolton, Wiley Engineering Mechanics: Dynamics, SI Edition, 4th Edition, Andrew Pytel, Jaan Kiusalaas, Cengage learning Technische Mechanik Set aus Lehrbuch und Prüfungstrainer Hartmann, Stefan, Wiley
Other Sources	-
Additional Course Material	
Documents	
Assignments	
Exams	

Course Composition		
Mathematics und Basic Sciences	30	%
Engineering	30	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge	40	%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**

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Lectures	14		72
Self-Study			
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1		10
Recitations	14		56
Laboratory			
Projects			
Final Exam	1		10
		Total Work Load	**148**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes	
1	In-depth knowledge of technical mechanics
2	Ability to model mechanical systems

Weekly Content	
1	kinematics of the mass point: basic concepts, kinematics of a mass point; Linear movement, spatial movement
2	Kinematics of the mass point: oblique throw, evaluation in different coordinate systems, relative movement
3	Kinetics of the mass point: equations of motion, work of the force
4	Kinetics of the mass point: power, efficiency and energy
5	Kinetics of the mass point: momentum and angular momentum

DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

6	Rigid body kinematics: motion, velocity, acceleration
7	Rigid body kinetics: equations of motion
8	Midterm Exams
9	Rigid body kinetics: work and energy
10	Rigid body kinetics: momentum and angular momentum
11	Vibration theory: Free linear undamped one-mass vibration
12	Vibration theory : Linear damped oscillations
13	Vibration theory: Free vibrations of the undamped, damped 2-mass oscillator
14	Repetition

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

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1	5	5	-	-	-	-	-
2	5	5	-	-	-	-	-

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=5946	
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Date of Compilation:	09.09.2022