

Course Title	Technical Mechanics 3				
Abbreviation	TME3				
Study Program	Mechanical Engineering – Bachelor				
Semester	3				
Language of Instruction	German				
Responsible Professor	Professor Dr. Eng. Andreas Nauerz				
Lecturers	Professor Dr. Eng. Gerhard Hiltcher, Professor Dr. Eng. Andreas Nauerz, Professor Dr. Eng. Stefan Halfmeier, Professor Dr. Eng. Stefan Steiger				
Classification in Curriculum	Required				
Contact Hours per Week	4				
Credits	5				
Prerequisites	TM1 (Statics of Rigid Bodies), Mathematics 3				
Competency Goals	<p>The qualification objectives of this course are in the areas of scientific and professional competencies.</p> <p>The goal is that the students can describe movement processes (path, velocity, and acceleration) of points and of rigid bodies in different coordinate systems. The students will understand the relationship between movement and the causative forces. The students can perform methods with help from movement equations to solve translative and rotational movements and mechanical oscillations.</p>				
Work Load		Contact Hours per Week	Total hours in Semester	Individual Work [hours]	Credits: 5
	Lectures	3	34	15	
	Exercises	1	11	40	
	Test Preparation			50	
	Total	4	45	105	Total Hours: 150
Course Contents	<ol style="list-style-type: none"> 1. Basics of Kinematics <ol style="list-style-type: none"> 1.1. Kinematics of a point 1.2. Spatial movement in cartesian coordinates 1.3. Spatial movement in cylindrical coordinates 1.4. Spatial movement in natural coordinates 1.5. Graphical representation of movement 				

	<ul style="list-style-type: none"> 1.6. Fundamental tasks of kinematics 2. Movement of Rigid Bodies <ul style="list-style-type: none"> 2.1. General movement of a rigid body 2.2. Planar movement of a rigid body 3. Kinematics of a Mass Point <ul style="list-style-type: none"> 3.1. Postulates of kinematics 3.2. Mathematical formulation of the laws of motion 3.3. Inertial systems 3.4. Application of the fundamental kinetic equation 3.5. Law of the conservation of energy in mechanics 3.6. Guided movement 3.7. Rotational movement of a SK around a fixed axis of rotation 3.8. Mass moments of inertia 3.9. Inertia, D'Alembert's principle 4. Impact Processes <ul style="list-style-type: none"> 4.1. Direct central impacts 4.2. Off-center impacts 5. Kinematics of a Rigid Unit <ul style="list-style-type: none"> 5.1. Basics 5.2. Change of coordinate system 5.3. Gyroscopic effects 5.4. Gyroscopic effects of rotors 5.5. Balance 5.6. Lagrange mechanics 6. Vibrations of a Mass Point <ul style="list-style-type: none"> 6.1. Free undamped vibrations 6.2. Torsional vibrations 6.3. Damped vibrations
Teaching Methods	Lectures, practice exercises, tutorials, lecture notes, learning platform "Moodle" (very similar to ISU Canvas)
Evaluation Test	120 minute test
Literature	Richard, H. A.; Sander, M.: Technische Mechanik - Dynamik, Vieweg 2008 Hibbeler, R.C.: Technische Mechanik 3, Dynamik, 10. Auflage, Pearson Studium, 2006 Holzmann, G. ; Meyer, H. ; Schumpich, G.:

	Technische Mechanik, Kinematik und Kinetik, 9. Aufl., Teubner , Stuttgart, 2006
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