DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
MAB311	3			Fall
Title	**T**	**A**	**L**	**ECTS**
Manufacturing Technology I	3	2		6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Mechanical Engineering					
Forms of Teaching and Learning						
Course Type	**Compulsory**	✓	**Elective**			
Objectives	Transfer of technical knowledge about the mechanics and technology of manufacturing processes with material removal. Knowledge of the complex material deformation and separation mechanisms at high temperatures and deformation speeds enables the description of tool wear and the workpiece properties after production. In addition, emphasis is placed on the use of coated tools, the machinability of various materials and the optimization of cutting conditions. This knowledge is used in many manufacturing processes and especially in gear manufacturing to understand the phenomena that take place during these processes.					
Content	• Crystal structure of workpiece and tool materials • Phenomena that occur during chip removal • Mechanics of the machining process with defined cutting edge geometry, simulation via FEM analysis • Cutting forces and temperatures during chip removal • Wear mechanisms of uncoated tools • Determination of coating properties and wear behavior of coated tools • Tool and layer materials • Machinability of various workpiece materials and use of cooling lubricants • Mathematical description of wear development and process monitoring • Tool geometries • Gear manufacturing processes, roughing and finishing					
Prerequisites	-					
Coordinator	Assist. Prof. Dr. Mehmet İPEKOĞLU					
Lecturer(s)	Prof. Dr. Konstantinos-Dionysios BOUZAKIS					
Assistant(s)	TA Ahmet Uğur BATUK, TA Sefer Arda SERBES, TA Emre OSMANOĞLU					
Work Placement	-					

Recommended or Required Reading	
Books / Lecture Notes	E-scripts are provided.
Other Sources	Bouzakis K., Mechanics and Technology of Manufacturing Processes with material removal (in Greek), ZITI Ed. Thessaloniki 2015

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

	Fritz Klocke, Band 1: Zerspanung mit geometrisch bestimmter Schneide VDI Bücher, Springer Verlag 2018
Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	10	%
Engineering	50	%
Engineering Design	20	%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge	20	%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	30
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	70
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	3	42
Self-Study	14	6	84
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	3	3

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

Total Work Load	**160**
ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes	
1	Students gain basic knowledge of technology, production and manufacturing concepts.
2	They can analyze manufacturing problems at a basic level and interpret their results.
3	Gain the ability to determine the method and process for manufacturing a product.
4	Gain the ability to determine the appropriate manufacturing method for the material at the basic level.
5	They have the background to follow up-to-date and contemporary issues in manufacturing methods and manufacturing technologies.
6	
7	
8	
9	
10	
11	
12	

Weekly Content	
1	Introduction
2	Crystal structure of workpiece and tool materials
3	Phenomena that occur during chip removal
4	Mechanics of the machining process with defined cutting edge geometry, simulation via FEM analysis
5	Cutting forces and temperatures during chip removal
6	Wear mechanisms of uncoated tools
7	Determination of coating properties and wear behavior of coated tools
8	Tool and layer materials
9	Midterm exam
10	Machinability of various workpiece materials and use of cooling lubricants
11	Mathematical description of wear development and process monitoring
12	Tool geometries
13	Gear manufacturing process, roughing
14	Gear manufacturing processes, fine machining
15	Additive manufacturing

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

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE SYLLABUS

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

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Prof. K.-D. Bouzakis
Date of Compilation:	31.05.2021