

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY **COURSE SYLLABUS**

Course Details									
Code				Acad	Academic Year			Semester	
MWT302				4			7		
Title				Т	Α	L	ECTS		
Material Production and Process	ing Technologies			2	2	1	6		
Language	German								
Level	Undergraduate	X	Graduate			Postgra	duate		
Department / Program	Energy Science and To	echnology							
Forms of Teaching and Learning	Face-to-face								
Course Type	Compulsory			Ele	ective				
Objectives	The aim is to develop students' analytical thinking skills, teach material production methods and technologies, and cover processes related to raw material acquisition, processing, and recycling.								
Content	The course content includes topics such as the design of structural components based on material properties, raw material acquisition and processing, casting technologies, sintering technologies, coating and thin-film coating technologies, plastic forming methods, joining processes, recycling, and resource efficiency.								
Prerequisites	None								
Coordinator	Dr. Sebastian Klemenz								
Lecturer(s)	Dr. Sebastian Klemenz								
Assistant(s)	None								
Work Placement	None								
Recommended or Required R	eading								
Books / Lecture Notes	Materials for Engineering, J. W. Martin. The Institute of Materials, London								
Other Sources	 B. Ilschner, R. Singer, Werkstoffwissenschaften und Fertigungs-technik, 5. Auflage, Springer, 2010 E. Hornbogen, G. Eggeler, E. Werner, Werkstoffe, 9. Auflage, Springer, 2008 W. D. Callister, Jr., Materials Science and Engineering, International Student Version, 8th Edition, Wiley, 2010 Manufacturing with Materials, Edwards, Endean, Butterworth Materials Science and Engineering, R. W. Cahn et al. VCH-Verlag The Production of Inorganic Materials, J. W. Evans, L. C. DeJonghe, Mc Millan Materials for Engineering, J. W. Martin. The Institute of Materials, London 								
Additional Course Material									
Documents	-								
Assignments	-								
Exams	1 Midterm, 1 Final								



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Course Composition					
Mathematics und Basic Sciences	10	%			
Engineering	70	%			
Engineering Design	,,	,	%		
Social Sciences			%		
Educational Sciences			%		
Natural Sciences		%			
Health Sciences		%			
Expert Knowledge	20)	%		
Assessment					
Activity	Cou	nt	Percentage (%)		
Midterm Exam	1		40		
Quiz	1				
Assignments					
Attendance					
Recitations					
Projects					
Final Exam	1	60			
	_	100			
ECTS Points and Work Load					
Activity	Count	Duration	Work Load (Hours)		
Lectures	14	2	28		
Self-Study	8	7	56		
Assignments	6	3	18		
Presentation / Seminar Preparation					
Midterm Exam	1	3	3		
Recitations					
Laboratory					
Projects	3	6			
Final Exam	1	3	3		
		Total Work Load	168		
	ECTS Poi	nts (Total Work Load / Hour)	6		
Learning Outcomes					
1 Learns mate	rial production methods and t	echnologies.			
-	rial production methods and t naterial extraction techniques				



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Gains	Gains knowledge about casting and powder metallurgy.							
Gains	Gains knowledge about post-production processing techniques.							
ntent								
Intro	duction to	Material Pro	duction Met	hods				
Class	ification of	Material Pro	duction Me	thods				
Com	onent Des	ign Based on	Material Pr	operties				
Raw	Raw Material Extraction and Processing - 1							
Raw	Material Ex	traction and	Processing	- 2				
Casti	ng Process	- 1						
Casti	Casting Process - 2							
Midt	Midterm Exam							
Sinte	Sintering Technology - 1							
Sinte	Sintering Technology - 2							
Coati	Coating and Thin Film Process - 1							
Coati	Coating and Thin Film Process - 2							
Shap	ing Process	es						
Joiniı	ng Method	S						
Recy	cling and R	esource Effic	iency					
End-	of-Semeste	r Exam						
on of Learn	ing Outcor	nes to Progra	am Objectiv	es (1-5)				
P1	P2	Р3	P4	P5	P6	P7	P8	P9
			2		3			
			2					
			<u> </u>	- 4: 11: 1 = 1:				
1 Level 1: Lo	ow 2: Low-in	termediate 3:	intermediat	e 4: High 5: V	ery High			
/ :	Res. Assist. Kevser Celep							
	ition: 11.02.2025							
	Gains Intro Class Comp Raw Raw Casti Casti Midte Sinte Coati Coati Shap Joinin Recy End-con of Learn P1	Gains knowledgentent Introduction to Classification of Component Des Raw Material Ex Raw Material Ex Casting Process Casting Process Midterm Exam Sintering Technol Sintering Technol Coating and Thir Coating and Thir Shaping Process Joining Methods Recycling and Re End-of-Semeste on of Learning Outcor P1 P2 The Level 1: Low 2: Low-in Res	Gains knowledge about post Introduction to Material Proc Classification of Material Proc Component Design Based on Raw Material Extraction and Raw Material Extraction and Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Proces Coating and Thin Film Proces Shaping Processes Joining Methods Recycling and Resource Efficient End-of-Semester Exam on of Learning Outcomes to Program P1 P2 P3 Res. Assist. Keys Res. Assist. Keys Res. Assist. Keys	Introduction to Material Production Met Classification of Material Production Met Component Design Based on Material Production Met Raw Material Extraction and Processing Raw Material Extraction and Processing Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Process - 1 Coating and Thin Film Process - 2 Shaping Processes Joining Methods Recycling and Resource Efficiency End-of-Semester Exam On of Learning Outcomes to Program Objective P1 P2 P3 P4 2 2 2 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	Gains knowledge about post-production processing to the the total production to Material Production Methods Classification of Material Production Methods Component Design Based on Material Properties Raw Material Extraction and Processing - 1 Raw Material Extraction and Processing - 2 Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Process - 1 Coating and Thin Film Process - 2 Shaping Processes Joining Methods Recycling and Resource Efficiency End-of-Semester Exam On of Learning Outcomes to Program Objectives (1-5) P1 P2 P3 P4 P5 2 2 2 2 2 1 1 Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: V	Gains knowledge about post-production processing techniques. Intent Introduction to Material Production Methods Classification of Material Production Methods Component Design Based on Material Properties Raw Material Extraction and Processing - 1 Raw Material Extraction and Processing - 2 Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Process - 1 Coating and Thin Film Process - 2 Shaping Processes Joining Methods Recycling and Resource Efficiency End-of-Semester Exam on of Learning Outcomes to Program Objectives (1-5) P1 P2 P3 P4 P5 P6 2 3 3 1 2 3 1 Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	Gains knowledge about post-production processing techniques. Introduction to Material Production Methods Classification of Material Production Methods Component Design Based on Material Properties Raw Material Extraction and Processing - 1 Raw Material Extraction and Processing - 2 Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Process - 1 Coating and Thin Film Process - 2 Shaping Processes Joining Methods Recycling and Resource Efficiency End-of-Semester Exam on of Learning Outcomes to Program Objectives (1-5) P1 P2 P3 P4 P5 P6 P7 2 3 3 2 3 3 1 Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High	Gains knowledge about post-production processing techniques. Introduction to Material Production Methods Classification of Material Production Methods Component Design Based on Material Properties Raw Material Extraction and Processing - 1 Raw Material Extraction and Processing - 2 Casting Process - 1 Casting Process - 2 Midterm Exam Sintering Technology - 1 Sintering Technology - 2 Coating and Thin Film Process - 1 Coating and Thin Film Process - 2 Shaping Processes Joining Methods Recycling and Resource Efficiency End-of-Semester Exam on of Learning Outcomes to Program Objectives (1-5) P1 P2 P3 P4 P5 P6 P7 P8 2 3 3 2 3 3 1 Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High