

DEPARTMENT OF MATERIALS SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
MWT403	4			7
Title	T	A	L	ECTS
Diffusion and Transport in Real Crystals	2	1	1	6
Language	German			
Level	Undergraduate	X	Graduate	Postgraduate
Department / Program	Materials Science and Technology			
Forms of Teaching and Learning	Face to face			
Course Type	Compulsory		Elective	X
Objectives	Gaining fundamental knowledge in physical and mechanical properties in the solid state which are controlled by the diffusion process.			
Content	Fick's laws of diffusion and thin film solution, Solution in sem- infinite diffusion couples (error function analysis), Diffusion under the thermodynamic driving forces, Product phase formations because of diffusion in real systems, Substitutional diffusion, Orientation dependence			
Prerequisites				
Coordinator				
Lecturer(s)	Asist Prof.Dr. Çağatay Elibol			
Assistant(s)				
Work Placement	No			
Recommended or Required Reading				
Books / Lecture Notes	Kristallstrukturen zweikomponentiger Phasen, K. Schubert Wiley-Verlag			
Other Sources				
Additional Course Material				
Documents				
Assignments				
Exams				
Course Composition				
Mathematics und Basic Sciences				40%
Engineering				20%
Engineering Design				20%
Social Sciences				%

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Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		20%

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)
Lectures	14	2	28
Self-Study	7	10	70
Assignments	6	6	36
Presentation / Seminar Preparation	1	1	1
Midterm Exam	1	2	2
Recitations	14	1	14
Laboratory			
Projects			
Final Exam	1	2	2
Total Work Load			181
ECTS Points (Total Work Load / Hours)			6

Learning Outcomes

1	Gaining fundamental knowledge in physical and mechanical properties in the solid state which are controlled by the diffusion process.
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Weekly Content

1	Fick's laws and their solution, atomic theory of diffusion (diffusion mechanisms in metals, semiconductors and ionic crystals; Self diffusion; Correlation effects; Isotopes and Pressure effect)
2	Thermodynamics of extraneous diffusion
3	Dislocation, surface and grain boundary diffusion
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Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
All	2	3	3	3			
1							
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Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	