DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
NWI204	2			4
Title	**T**	**A**	**L**	**ECTS**
Measurement Techniques	2		2	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**	**X**	**Elective**			
Objectives	Understand the theory of measurement, knowledge of sensors, Knowledge of methods of measuring different sizes, Group work ability for laboratory exercises					
Content	Introduction to metrology Measuring electrical quantities in theory and in practice Measuring non-electrical quantities in theory and in practice Understand the characteristics of transducers Digital metrology, Measurement error analysis and statistical evaluation, Static and dynamic behavior of measuring instruments					
Prerequisites						
Coordinator	None					
Lecturer(s)	Dr. Sungur Aytac					
Assistant(s)	None					
Work Placement	No					

Recommended or Required Reading	
Books / Lecture Notes	U. Kiencke, R. Eger: "Technique of measurement: Messtechnik“, 6. Aufl., Springer, 2005. J. Niebuhr, G. Lindner: „Physikalische Messtechnik mit Sensoren: Physical Measurement with Sensors “, 5. Aufl., Oldenbourg, 2005. E. Schrüfer: „Elektrische Messtechnik: Measurement of electrical and not electrical quantities: Messung elektrischer und nichtelektrischer Größen“, 7. Aufl., Hanser, 2001 J. Hoffmann: „Taschenbuch der Messtechnik: Pocketbook of Measuring“, 4. Aufl., Hanser, 2004
Other Sources	Heyne, Georg Elektronische Meßtechnik Eine Einführung für angehende Wissenschaftler, OLDENBOURG Wissenschaftsverlag GmbH, 1999 ISBN 3-486-24976-2 ISBN: 978-3-486-24976-7 F. Puente León: Messtechnik, Springer-Verlag, Berlin Heidelberg, 2016, ISBN 978-3-662-44820-5

Additional Course Material	
Documents	

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Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences		30%
Engineering		70%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%
Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	25%
Quiz		
Assignments		
Attendance		
Recitations	14	15%
Projects		
Final Exam	1	60%
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	2	28
Self-Study	10	10	100
Assignments	4	8	32
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	1	14
Laboratory	14	1	14
Projects			
Final Exam	1	2	2
		Total Work Load	**192**
		ECTS Points (Total Work Load / Hours)	**6**

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Learning Outcomes	
1	Understand the theory of methodology
2	Knowledge of sensors
3	Ability of group work in the laboratory environment
Weekly Content	
1	Introduction to measurement technology
2	Introduction to laboratory exercises and safety rules. Measuring devices
3	Metals and semiconductors
4	Measuring electrical quantities
5	Measuring electrical quantities
6	Active and passive sensors
7	Measuring non-electrical quantities
8	Measuring non-electrical quantities
9	Characteristics of the transducers
10	Measuring circuits
11	Digital measurement technology
12	Several examples from industry
13	Measurement error and statistical evaluation
14	Static and dynamic behavior of measuring instruments

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

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	