ROBOTICS AND INTELLIGENT SYSTEMS MASTER PROGRAM
COURSE SYLLABUS

Course Details					
Code			**Academic Year**		**Semester**
RIS 518			1		**2**
Title			**T**	**A**	**L**	**ECTS**

Title		T	A	L	ECTS
Sensors and Transducers II		2	1	2	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Robotics and Intelligent Systems					
Forms of Teaching and Learning	Formal Teaching					
Course Type	**Compulsory**		**Elective**		✓	
Objectives	The main objectives of this modul are to make students familiar with the constructions and working principle of different types of sensors and transducers as well as to make students aware about the measuring instruments and the methods of measurement and the use of different transducers.					
Content	• A general introduction to Sensors and Transducers II • Acoustic sensors and actuators • Chemical and biological sensors and actuators • Radiation sensors and actuators • MEMS and smart sensors and actuators • Instrumentation techniques					
Prerequisites						
Coordinator						
Lecturer(s)	Assoc. Prof. Dr. Tuba ÇONKA YILDIZ / Asst. Prof. Dr. –Ing. Abdulkadir ŞANLI					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	• Ida, N. (2014). Sensor, Actuators and their Interfaces: A Multidisciplinary Introductions.(1st eds). SciTech, Edison, NJ. • M. J. Usher (auth.) - Sensors and Transducers (1985, Macmillan Education UK) • Dunn, P. F. (2011). Fundamentals of sensors for engineering and science. Crc Press. • Sensor & transducers, D. Patranabis, 2nd edition, PHI • Instrument transducers, H.K.P. Neubert, Oxford University press. • Measurement systems: application & design, E.A.Doebelin, Mc Graw Hill
Other Sources	

Additional Course Material	
Documents	
Assignments	

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Exams	

Course Composition

Mathematics und Basic Sciences		%15
Engineering		%55
Engineering Design		%20
Social Sciences		%
Educational Sciences		%
Natural Sciences		%10
Health Sciences		%
Expert Knowledge		%

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	2	28
Self-Study	14	10	140
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
Total Work Load			**200**
ECTS Points (Total Work Load / Hour)			**7**

Learning Outcomes

1	Use concepts in common methods for converting a physical parameter into an electrical quantity

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2	Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light
3	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc
4	Predict correctly the expected performance of various sensors
5	Locate different type of sensors used in real life applications and paraphrase their importance
6	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
7	
8	
9	
10	
11	
12	

Weekly Content

1	Introduction to Sensors and Transducers II
2	Chemical and biological sensors and actuators
3	Chemical and biological sensors and actuators
4	Radiation sensors and actuators
5	Radiation sensors and actuators
6	MEMS and smart sensors and actuators
7	MEMS and smart sensors and actuators
8	*Midterm Exam*
9	Nano sensors and actuators
10	Nano sensors and actuators
11	RFIDs and embedded sensors
12	Instrumentation techniques of sensors
13	Instrumentation techniques of sensors
14	Interface of Sensors with Microprocessors
15	Interface of Sensors with Microprocessors

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

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5				
2	5	3	3				
3	5	4	4				

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4	5	5	5				
5	3	5	5				
6	5	5	5				
7	5	5	5				
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Asst. Prof.Dr.-Ing. Abdulkadir ŞANLI
Date of Compilation:	15.06.2021