AGU Graduate School of Engineering and Science ……
Program

COURSE RECORD

Code	**ECE 588**
Name	**Sensors and Measurement Systems**
Hour per week	3+0 (Theory + Practice)
Credit	3
ECTS	10
Level/Year	Undergraduate/Graduate
Semester	Fall
Type	Elective
Location	Classroom
Prerequisites	Electronics 1, 2, Circuits 1, 2.
Special Conditions	-
Coordinator(s)	Dr. Öğr. Üyesi Kutay İçöz
Webpage	-
Content	Working principles of sensors, sensor materials, sensor characterization, measurement systems, performance limitations, measurement techniques, measurement uncertainty, selectivity/sensitivity, noise
Objectives	(1) to introduce sensors and fundamentals of sensor design; (2) to understand the theory of measurement uncertainty, and how the theory is used in practice. (3) to understand what sources of noise exist in an instrumentation circuit. (4) to understand how the electrical circuits that are combined with sensors in instrumentation circuits affect its functionality.
Learning Outcomes	LO1 Interpret physical principles applied in sensors LO2 Design and fabricate sensors with desired physical and chemical properties LO3 Identify various types of sensors including thermal, mechanical, electrical, electromechanical and optical sensors LO4 Implement sensors for physical, chemical, and biochemical applications
Requirements	Sabrie Soloman Sensors Handbook 2nd Edition, McGrawHill
Reading List	Krzysztof Iniewski, Smart Sensors for Industrial Applications CRC Press Taylor and Francis Group: 2013
Ethical Rules and Course Policy	University Ethics (Academic Honesty) Rules

LEARNING ACTIVITIES

Activities	**Number**	**Weight (%)**
Lecture	13	40%
Group Works	3	40%
Presentations	2	15%
Web search	2	5%
	Total	100

ASSESSMENT

Evaluation Criteria	**Weight** (%)
Quizzes	15%
Weekly Assignments	10%
Group Project Assignments & Presentations	35%
Attendance/Participation	05%
Midterm Exam	15%
Final Exam	20%

	Total	100%

COURSE LOAD

Activity	**Duration** (hour)	**Quantity**	**Work Load** (hour)
In class activities	3	14	42
Group work	10	6	60
Research (web, library)	2	5	10
Required Readings	2	5	10
Pre-work for Presentation	3	4	12
Quiz	5	4	20
Studying for Midterm Exam	20	1	20
Studying for Final Exam	20	1	20
Term Project	30	2	60
		General Sum	**254**

ECTS: 10 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6
LO1	5	5	5	3	2	4
LO2	5	5	3	2	2	3
LO3	5	5	4	2	2	3
LO4	4	3	2	2	2	3

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

WEEKLY SCHEDULE

W	**Topic**	**Outcomes**
1	Introduction to sensor, fundamentals	LO1, LO2
	Activity: Lecture, Web Search	
2	Sensor Characterization	LO3
	Optical sensors	
3	Fiber optics in sensors	LO3
	Activity: Lecture, Group Work	
4	Industrial Sensors	LO1, LO5
	Activity: Lecture, Group Work	
5	Sensors in Flexible Manufacturing Systems	LO3, LO4, LO5
	Activity: Presentation	
6	Midterm exam	
	Activity:	
7	Microelectromechanical Systems (MEMS) based Sensors	LO1, LO3, LO5
	Activity: Lecture, Group Work	
8	Magnetic Sensors	LO1, LO3, LO5
	Activity: Lecture, Group Work	
9	MEMS in Medical Industry	LO2, LO5
	Activity: Lecture, Group Work	
10	Color Machine Vision	LO2, LO5
	Activity: Lecture, Group Work	
11	Environmental Sensors	LO2, LO5
	Activity: Lecture, Group Work	
12	Smart Prosthetics	LO1, LO2, LO3, LO5
	Activity: Lecture, Group Work	
13	Advanced Sensor Designs	LO1, LO2, LO3, LO5
	Activity: Lecture, Group Work	
14	Presentation of term project to class	LO1, LO2, LO3,

Activity: Group Work, Presentation	LO4, LO5

Assistant Professor Kutay İçöz
May 10, 2018