ABDULLAH GÜL UNIVERSITY
INSTITUTE OF SCIENCE
ELECTRIC and COMPUTER ENGİNEERING ANABİLİM DALI
INDIVIDUAL COURSE DESCRIPTION

Course Ttitle	Code	Semester	T+U Hours	Credit	ECTS
WIRELESS SENSOR NETWORKS	ECE-512	SPRING	3 + 0	3	10

Prerequisities and co-re-requisities	None

Type	Elective
Language	English
Coordinator	Assoc. Prof. V. Çağrı Güngör
Instructor	Assoc. Prof. V. Çağrı Güngör
Adjunt	None
Aim	This course provides a comprehensive overview of wireless sensor networks and their real-world applications. The topics include wireless sensor network protocols, network architectures and management, error control techniques, optimal packet size design, cross-layer communication protocol solutions, localization algorithms, ZigBee, IEEE 802.15.4, 6LowPAN, underwater and underground sensor networks, wireless sensor and actor networks, and wireless multimedia sensor networks. After completing the course, students will get an advanced understanding about the wireless sensor networks and related problem solving discipline using mathematics / engineering principles.
Learning Outcomes	1.An ability to design and develop algorithms for wireless sensor networking problems 2.An ability to develop test and monitoring programs for wireless sensor networks 3. An ability to analyze and evaluate the performance of wireless sensor networks 4. An ability to design and develop error control algorithms for wireless sensor networks 5. An ability to design and develop algorithms for wireless sensor networking problems 6. An ability to analyze and evaluate the performance of underwater wireless sensor networks 7. An ability to analyze and evaluate the performance of underground wireless sensor networks
Course Content	• An overview of wireless sensor networks (WSNs) • Applications and design factors of WSNs • Transport layer protocols for WSNs • Routing layer protocols for WSNs • MAC layer protocols for WSNs • Wireless Channel Models for WSNs • Cross Layer Protocols for WSNs • Error control techniques for WSNs • Underwater Sensor Networks • Underground sensor Networks

WEEKLY TOPICS AND PRELIMINARY STUDY

Week	Topics	Preliminary Study
1	An overview of wireless sensor networks	The relevant book chapters and materials from the literature
2	Description and review of WSN applications and Design Factors	The relevant book chapters and materials from the literature
3	Description and review of Transport layer protocols for WSNs	The relevant book chapters and materials from the literature
4	Description and review of Routing layer protocols for WSNs	The relevant book chapters and materials from the literature
5	Description and review of MAC layer protocols for WSNs	The relevant book chapters and materials from the literature
6	Wireless Channel Models for WSNs	The relevant book chapters and materials from the literature
7	Wireless Channel Models for WSNs	The relevant book chapters and materials from the

	(Continued)	literature
8	Midterm Exam	
9	Error Control Techniques for WSNs	The relevant book chapters and materials from the literature
10	Packet Size Optimization for WSNs	The relevant book chapters and materials from the literature
11	ZigBee and IEEE 802.15.4 Standard	The relevant book chapters and materials from the literature
12	Underwater Sensor Networks	The relevant book chapters and materials from the literature
13	Underground Sensor Networks	The relevant book chapters and materials from the literature
14	Description and review of Cross Layer Protocols	The relevant book chapters and materials from the literature
15	Project Presentations	
16	Final Exam	

SOURCES	
Lecture Notes	Lecture slides
Other Sources	**Course Textbook:** **Additional Materials** • W. Stallings, “Data and Computer Communications,” Prentice Hall, 8th edition, 2007. • I.F. Akyildiz and M.C. Vuran, ''Wireless Sensor Networks,'' John Wiley & Sons, 2011

COURSE MATERIALS SHARING	
Documents	
Homeworks	7
Exams	1 Midterm Exam and 1 Final Exam

EVALUATION SYSTEM		
SEMESTER STUDY	**NUMBER**	**CONTRIBUTION**
MIDTERM	1	30
Homeworks	7	35
FINAL EXAM	1	35
TOTAL		100

Course Category	
Sciences and Mathematics	50%
Engineering	50%
Social Sciences	0%

RELATIONSHIPS BETWEEN LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS							
No	Program Qualifications	Contribution Level				
		1	2	3	4	5
1	Skills of using Mathematical, Science and Engineering Knowledge in Advanced Research					**x**
2	Skills of analyzing, designing and/or implementing an original system which will solve an Engineering Problem					**x**
3	Skills of using software, hardware and modern measurement instruments for advanced research in one’s field of expertise					**x**
4	Skills of planning, detailing and doing independent research					**x**

5	Skills of following literature, making and/or listening technical presentation, writing academic level article				x	
6	Skills of finding original ways by means of innovative thinking and questioning					x

Increasing from 1 to 5

ECTS / WORK LOAD TABLE			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 16x total course hours)	16	3	48
Out-of-class Study Time (Pre-study, practice)	16	5	90
Internet search, library work, literature search	16	3	48
Homework	7	13	91
Midterm	1	15	15
Final Exam	1	20	20
Total Work Load			312
Total Work Load / 30			312/30
Course ECTS Credit			10