COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
INDUSTRIAL AUTOMATION SYSTEMS	**ESYE654**	**2**	**2 + 1**	**3**	**10**

Prerequisites	

Language of Instruction	English
Course Level	Ph.D. Degree
Course Type	Elective
Course Coordinator	
Instructors	Assoc.Prof.Dr.Sedat ŞİŞBOT
Assistants	
Goals	The aim of this course is to provide students with knowledge and abilities to comprehend design and operation philosophy of industrial automation systems.
Content	General outlook for the industrial automation systems. Hierarchical structure of the layers of automation systems and the links between the layers. Risks and failure analysis- Paper reviews for the subject. Instruments and Actuators. Controllers. MIS and Expert Systems. Plant automation. Network topologies and protocols. Standards and Procedures.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1)Comprehends and comments on the industrial automation systems with their hierarchical layers and links between these layers.	1,3,4	1,2,4	A,B,D
2)Applies RAM (Reliability-Availability-Maintainability) concept to industrial automation systems.	1,3,4	1,2,4	A,B,C,D
3)Enumerates and compares the fundamental measurement techniques and methods of the physical quantities together including their dynamic and static characteristics	1,3,4	1,2,4	A,B,C,D
3)Applies theoretically PLC and DCS hardware to an industrial network.	1,3,4	1,2,4	A,B,D
4)Analyzes and compares advanced control algorithms employed industrial automation systems.	7,8,9	1,2,4	A,B,D

5)Prepares and presents in writing and orally a scientific documents.	7,8,9	4	D

Teaching Methods:	1: Lecture, 2: Paper discussion, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B:Paper Summary, C: Homework, D: Project

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	General outlook for the industrial automation systems (IAS)	Lecture Notes +Recommended Books
2	Hierarchical structure of the layers of IAS and the links between the layers	Lecture Notes +Recommended Books
3-4	Risks and failure analysis- Paper reviews for the subject	Lecture Notes +Papers
5	Layer 1: Instruments and Actuators	Lecture Notes +Recommended Books
6	Layer 2: Controllers	Lecture Notes +Recommended Books
7	Layer 3: MIS and Expert Systems	Lecture Notes +Recommended Books
8	Layer 4: Plant automation, ERP, MRP	Lecture Notes +Recommended Books
9	Network topologies and protocols	Lecture Notes +Recommended Books
10	Standards and Procedures	Lecture Notes +Recommended Books
11-14	Investigation of few application example and reports and presentations	Related Papers and Application Notes

RECOMMENDED SOURCES	
Textbook	Stenerson, Industrial Automation and Process Control, Prentice Hall, 2003, ISBN:0-13-033030-2
Additional Resources	C.D. Johnson, Process Control Instrumentation Technology, 1997, Prentice Hall, ISBN:0-13-261496-0

MATERIAL SHARING

Documents	Articles
Assignments	
Exams	1 Midterm, 1 Final

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Mid-terms	1	25
Term Project	1	75
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		60
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		40
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution 1	2	3	4	5
1	Ability to reach knowledge in breadth and depth through scientific research in Systems Engineering field; to have extensive knowledge about current techniques and procedures together with their constraints.					X
2	Ability to complement and apply knowledge by scientific methods utilizing limited or missing data; to use knowledge in different disciplines effectively by blending them.					
3	Ability to formulate Systems Engineering problems; to develop novel and original ideas and procedures for their solutions and to use innovative procedures in solutions.					X
4	Awareness of new and developing applications in Systems Engineering; ability to investigate and learn these applications when required.					X
5	Ability to design and apply analytical, and modeling and experimental based research; to solve and interpret complex situations encountered in this process.					

6	Ability to lead multi-disciplinary teams; to develop solution approaches in complicated situations and to take responsibility.				
7	Ability to develop novel and/or original ideas and methods; to develop innovative solutions for the design of systems, parts or the processes.				X
8	Ability to communicate orally or in writing the process and the results of Systems Engineering studies systematically and openly in national or international platforms.				X
9	Ability to master a foreign language (English) at the European Language Portfolio B2 General Level to communicate orally or in writing.				X
10	Ability to recognize social, scientific and ethical values in the process of collection, interpretation and publishing of data, and in all professional activities.				
11	Ability to visualize social and environmental dimensions of Systems Engineering applications and to observe these dimensions in professional practice.				
12	Ability to develop appropriate methodology and procedures for the modeling, improvement, control and design of complex systems for a specified target.				

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 13x Total course hours)	13	3	39
Hours for off-the-classroom study (Pre-study, practice)	13	10	130
Project	1	72	72
Midterm	1	2	2
Final	1	3	3
Total Work Load			246
Total Work Load / 25 (h)			9,84
ECTS Credit of the Course			10