COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Research Methodologies in Systems Engineering	**ESYE501**	**1**	**3+0**	**3**	**10**

Prerequisites	

Language of Instruction	English
Course Level	M. Sc.
Course Type	Compulsory
Course Coordinator	
Instructors	Prof.Dr.RaufNişel
Assistants	
Goals	The objective of the course is to help students to develop practical knowledge and skills to understand and carry out research projects.
Content	The course is designed to give students opportunity to do diagnostic analysis of data structures for the application of statistical methods by using SPSS statistical package program.

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1. Developing research model based on subject of interest	1,5	1,2,3,4	A,B,C,D
2. Measuring validation of the research model scientifically	1,10,12	1,2,3,4	A,B,C,D
3. Measuring reliability of the research model scientifically	12	1,2,3,4	A,B,C,D
4. Scientific report of conclusions of the research	8,9	1,2,3,4	A,B,C,D
5. Determination of weaknesses and strengths of methodologies used in research analysis	1,12	1,2,3,4	A,B
6. Criticism on conceptual structure of the research model	5,10	1,2,3,4	A,B

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	Basic concepts of data analysis	Textbook
2	Introduction to statistical package program	Textbook
3	Concepts of reliability and validity	Textbook
4	Stages of research analysis	Textbook
5	Structure of the research data	Textbook
6	Characteristics of data scaling	Textbook
7	types of scales	Textbook
8	Questionnaire design	Textbook
9	Developing instruments based on rating scales	Textbook
10	Measuring reliability of instruments (internal consistency and stability)	Textbook
11	Measuring validity of instruments (hypothesis testing)	Textbook
12	Statistical analysis of research model	Textbook
13	Applications of univariate and multivariate techniques based on quantitative and qualitative data	Textbook
14	Characteristics of the format of a research report	Textbook

RECOMMENDED SOURCES	
Textbook	Sekaran U., Research Methods for Business, John Wiley and Sons Inc, New York.
Additional Resources	

MATERIAL SHARING	
Documents	Students are required to read the assigned topics before the scheduled class sessionand to submit a research report at the end of semester
Assignments	Midterm and Final Exams
Exams	Students are required to read the assigned topics before the scheduled class sessionand to submit a research report at the end of semester

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	40
Assignment		
Lab Work		
Term Project	1	60
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE	1	40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE	1	60
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.					
4	Awareness of new and developing applications in Systems Engineering; ability to investigate and learn these applications when required.					
5	Ability to design and apply analytical, and modeling and experimental based research; to solve and interpret complex situations encountered in this process.					**X**
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.					
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.				**X**	
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.					**X**

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (14x3)	14	3	42
Reading the course materials	14	3	52
Midterm examination	1	2	2
Homework	4	6	24
Project(Preparation plus presentation)	1	60	60
Hours of studying for the exams (Midtermand Final)	1	70	70
Final examination	1	3	3
Total Work Load			253
Total Work Load / 25 (h)			10.12
ECTS Credit of the Course			10