

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

Prerequisites	
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Language of Instruction	English
Course Level	M. Sc.
Course Type	Compulsory
Course Coordinator	
Instructors	Prof.Dr.Rauf Nişel
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
Developing research model based on subject of interest	3,4	1,2,3,4	A,B,C,D
Measuring validation of the research model scientifically	1	1,2,3,4	A,B,C,D
Measuring reliability of the research model scientifically	1	1,2,3,4	A,B,C,D
Scientific report of conclusions of the research	4,5,6,8,10	1,2,3,4	A,B,C,D
Determination of weaknesses and strengths of methodologies used in research analysis	7,8	1,2,3,4	A,B
Criticism on conceptual structure of the research model	9	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	
Assignments	Students are required to read the assigned topics before the scheduled class session and to submit a research report at the end of semester
Exams	Midterm and Final Exams

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
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COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Ability to understand and apply natural sciences, mathematics and engineering sciences in advanced level.					X
2	Ability to possess wide and deep knowledge in the field of Industrial and Systems Engineering including the most recent advances.					
3	Ability to possess advanced level of required skill, techniques and methods to conduct research by using and evaluating up-to-date information.					X
4	Ability to model, design and develop solutions, under realistic constraints, a system, a process or a product by generating innovative and original ideas.				X	
5	Ability to transfer advancements in scientific, technical and cultural developments to the society with the ethical responsibility and scientific objectivity.					X
6	Ability to perceive, design and apply an original research process independently: manages this process successfully.				X	
7	Ability to execute a comprehensive study that brings innovation to the science and technology or develops technological product/process or adapts an already known method to a new field.					X

8	Ability to contribute to the development of science and technology literature by publishing research results in respectable scientific platforms.								X
9	Ability to analyze, synthesize and evaluate critically the ideas and developments in the field of specialization.								X
10	Ability to communicate effectively in writing, orally and visually with peers and wide scientific and social communities by using a foreign language at a level of European Language Portfolio C1 General Level.								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 (Midterm and 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