OSTIM TECHNICAL UNIVERSITY
FACULTY OF ECONOMICS AND ADMINISTRATIVE SCIENCES
ECONOMICS DEPARTMENT
COURSE SYLLABUS FORM
2022-2023 SPRING

ECON 106 Research Methods with Computer Applications II							
Course Name	**Course Code**	**Period**	**Hours**	**Application**	**Laboratory**	**Credit**	**ECTS**
Research Methods with Computer Applications II	ECON 106	2	2	1	0	3	5

Language of Instruction	English
Course Status	Compulsory
Course Level	Bachelor
Learning and Teaching Techniques of the Course	Lecture, Question-Answer, Problem Solving
Class Time/Classroom	
Instructor	Asst.Prof. Dr. Melike Aktaş Bozkurt
Office	9th Floor-913
E-mail	melike.aktasbozkurt@ostimteknik.edu.tr
Office Hours	11:50-14:50 on Tuesdays and by e-mail
Teaching Assistants	(If Applicable) Huzeyfe Erkam Candan (huzeyfe.candan@ostimteknik.edu.tr) Office Hours: By e-mail

Course Objective
The aim of the course is to provide students with a comprehensive understanding of the research process, including design, data collection and analysis, and interpretation of results, using computer software and applications. The course aims to equip students with the skills necessary to plan, implement, and communicate research findings effectively, and to enable them to apply these skills in their own research projects.

Learning Outcomes
The students who become successful in this course will be able; • to have knowledge of computer applications for data analysis, such as statistical software and data visualization tools. • to plan and design a research study, including selection of appropriate research methods, development of research questions and hypotheses, and selection of appropriate data source • to interpret research results, draw conclusions, and communicate findings effectively. • to apply research findings to real-world problems and make data-driven decisions. • to have critical thinking and problem-solving skills, which can be applied to a variety of research and data analysis projects.

Course Outline
This course introduces statistical reasoning, emphasizing how Statistics can help us understand the world. Topics include multiple regression, analysis of variance methods and model building with multiple regression. Students will learn to apply statistical concepts to data and reach conclusions about real-world problems with the applications of Excel, R, Gretl and Python.

Weekly Topics and Related Preparation Studies		
Weeks	**Topics**	**Preparation Studies**
1	Introduction to Multivariable Relationships (Agresti, Chap.10)	– Association and Causality – Controlling for Other Variables – Types of Multivariate Relationships – Inferential Issues in Statistical Control
2	Introduction to Multiple Regression (Agresti, Chap.11)	– The Multiple Regression Model – Multiple Correlation and R2 – Inferences for Multiple Regression Coefficients
3	Introduction to Multiple Regression (Agresti, Chap.11)	– Modeling Interaction Effects – Comparing Regression Models – Partial Correlation – Standardized Regression Coefficients
4	Regression with Categorical Predictors: Analysis of Variance Methods (Agresti, Chap.12)	– Regression Modeling with Dummy Variables for Categories – Multiple Comparisons of Means – Comparing Several Means: Analysis of Variance
5	Regression with Categorical Predictors: Analysis of Variance Methods (Agresti, Chap.12)	– Two-Way ANOVA and Regression Modeling – Repeated-Measures Analysis of Variance – Two-Way ANOVA with Repeated Measures on a Factor
6	Multiple Regression with Quantitative and Categorical Predictors (Agresti, Chap.13)	– Models with Quantitative and Categorical Explanatory Variables – Inference for Regression with Quantitative and Categorical Predictors – Case Studies: Using Multiple Regression in Research – Adjusted Means – The Linear Mixed Model
7	Review	– Problem solving session
8	**MIDTERM EXAM**	
9	Model Building with Multiple Regression (Agresti, Chap.14)	– Model Selection Procedures – Regression Diagnostics

10	Python Programming Language	– Introduction to Python and Jupyter notebooks. – Variables and data types – Input-Output statements – Operators in Python
11	Python Programming Language	– List, tuples, and dictionaries. – Conditionals - if, elif, else, and loops – Functions in python – Maps and Filters
12	Python Programming Language	– Numpy and Pandas: Operations and functions to work with data – Pandas Dataframes & Series: Operations and applications – Data Visualization: The Matplotlib and Seaborn libraries
13	Python Programming Language	– Machine Learning Linear Regression
14	Matrix Laboratory (MATLAB) Language	
15	Review	– Problem solving session
16	**FINAL EXAM**	

Textbook(s)/References/Materials:
Textbook: Agresti, A. (2018). Statistical methods for the social sciences. Pearson.
Supplementary References:
Other Materials:-

Assessment		
Studies	**Number**	**Contribution margin (%)**
Attendance		
Lab		
Class participation and performance	**1**	**10**
Field Study		
Course-Specific Internship (if any)		
Quizzes / Studio / Critical		
Homework		
Presentation		
Projects	**1**	**10**
Report		
Seminar		
Midterm Exam/Midterm Jury	**1**	**30**
General Exam / Final Jury	**1**	**50**
Total		**100**
Success Grade Contribution of Semester Studies		**50**
Success Grade Contribution of End of Term		**50**
Total		**100**

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Course hours (Including the exam week): 16 x total course hours)	16	3	48
Laboratory			
Application			
Course-Specific Internship (if any)			
Field Study			
Study Time Out of Class	10	4	40
Presentation / Seminar Preparation			
Projects	1	15	15
Reports			
Homework			
Quizzes / Studio Review			
Preparation Time for Midterm Exams / Midterm Jury	1	16	16
Preparation Period for the Final Exam / General Jury	1	20	20
Total Workload	**(139/30 = 4,63)**		**139**

Course' Contribution Level to Learning Outcomes							
Nu	**Learning Outcomes**	**Contribution Level**					
		1	**2**	**3**	**4**	**5**
LO1	to have knowledge of computer applications for data analysis, such as statistical software and data visualization tools.					X
LO2	to plan and design a research study, including selection of appropriate research methods, development of research questions and hypotheses, and selection of appropriate data source					X
LO3	to interpret research results, draw conclusions, and communicate findings effectively.					X
LO4	to apply research findings to real-world problems and make data-driven decisions.					X
LO5	to have critical thinking and problem-solving skills, which can be applied to a variety of research and data analysis projects.					X

Relationship Between Course Learning Outcomes and Program Competencies (Department of Economics)							
Nu	**Program Competencies**	**Learning Outcomes**					**Total Effect (1-5)**
		LO1	**LO2**	**LO3**	**LO4**	**LO5**	
1	Know the basic concepts used in economics, the relations between concepts, economic theories, the functioning mechanisms of the economy and the development processes of economies over time.						
2	Know how to obtain economic data and the research methods for processing and evaluating the obtained data by using various computer programs when necessary.	x				x	5
3	Follow current developments in national and international macroeconomic conjuncture and world economic relations and can			x			3

	suggest economic policies to be used in case of economic problems.						
4	Acquire the capacity to conduct individual research on the field, interpret the results, and compare them with theoretical propositions.	x	x				5
5	Scrutinize and interpret all kinds of knowledge in the field of economics, including theoretical and statistical information, through analysis within the framework of cause-effect relationships.	x			x		4
6	Present solutions and opinions about the problems analyzed by supporting them with qualitative and quantitative data, use an analytical language, and support the used approach with visual and graphical materials.	x					5
7	Gain advanced skills in software and programming languages that assist analysis in the econometric field and can adapt to new software and programming languages		x	x			5
8	Support the acquired theoretical knowledge of economics with econometric and statistical calculations, analyze and evaluate phenomenon using software and programming languages within the framework of analytical thinking.	X		x			5
9	Develop the ability to analyze unexpected and complex problems to be encountered during professional practice, can take responsibility as an individual or team member for solving the problem, and take initiative when necessary.						
10	Develop critical thinking and produce solutions on policy issues by adapting the theoretical and analytical knowledge to different conceptual frameworks.						
11	Exhibit approaches that will adapt to the speed of globalization, innovations and technological developments.						
12	Having an entrepreneurial spirit, develop original and innovative ideas, solution proposals and assume responsibility.						
13	Pay maximum attention to social responsibilities, ethical sensitivities and legal framework in theoretical and practical studies.						
14	Communicate with peers, colleagues, co-workers, employees and managers with common sense, empathy and situational awareness.						
15	Communicate effectively with colleagues, senior managers and the market, both in mother tongue and in at least one foreign language (English).						
Total Effect							32

Policies and Procedures

Web page: https://www.ostimteknik.edu.tr/economics-752
Exams: The exams aim at assessing various dimensions of learning: knowledge of concepts and theories and the ability to apply this knowledge to real world phenomenon, through analyzing the situation, distinguishing problems and by suggesting solutions. The written exams can be of two types, i.e., open-ended questions, which can also be in the form of problems or multiple-choice questions. Exams are composed of a final exam comprising 50% of the student's grade and a mid-term exam, with less weight. The rest of the grade comes from other assessment methods, shown in the assessment table included in this syllabus. The Department of Economics does not tolerate any act of academic dishonesty. Examinations are individual and must be completed without any outside assistance. Students who attempt to cheat during exams will receive a failing grade from that exam. The case could also be carried to the Dean's Office for additional disciplinary action.
Assignments: The assignments could be in the form of Homework or paper writing. A paper must include 1- Abstract 2- Introduction, 3- Literature review 4- Research Method, 5- Findings and Discussion 6- Conclusion. Scientific Research Ethic Rules are very important while preparing assignments. The students should be careful about citing any material used from outside sources and reference them appropriately. The students must not adopt "cut-copy-paste" behavior from the sources in the internet or use the contents of any type of previous work in their assignments. Plagiarism is unethical behavior and is subject to disciplinary action.
Missed exams: Any student missing an exam needs to bring an official medical report to be able to take a make-up exam.
Projects: The projects (if are a part of the course requirements) could be performed either individually or in groups, without engaging in plagiarism.
Attendance: Attendance requirements are announced at the beginning of the term. Student are usually expected to attend at least 70% of the classes during each term.
Objections: If the student observes a material error in his/her grade, he/she has the right to place an objection to the Faculty or the Department. The claim is examined and the student is notified about its outcome.