EASTERN MEDITERRANEAN UNIVERSITY
DEPARTMENT OF INDUSTRIAL ENGINEERING

IENG385/MANE385 STATISTICAL APPLICATIONS IN ENGINEERING COURSE OUTLINE

Date: *22/09/2021 – Rev.1*

COURSE CODE	IENG332/MANE332	**COURSE LEVEL**	Third Year
COURSE TITLE	Statistical Applications in Engineering	**COURSE TYPE**	Area Core
CREDIT VALUE	(3, 0, 1) 3	**ECTS**	5
PRE-REQUISITE(S)	MATH 322	**CO-REQUISITE(S)**	
SEMESTER / ACADEMIC YEAR	Fall 2021-22		

	Name(s)	**E-mail**	**Office**
LECTURER(S)	Asst. Prof. Dr. Ali Baştaş	ali.bastas@emu.edu.tr	IE-C104
ASSISTANTS	TBC		

COURSE DESCRIPTION

Collection and Presentation of data, descriptive measures, Sampling in industrial production, Parametric and Non parametric estimation of product and process parameters, Properties of a good estimator, Minimum Variance Unbiased estimator, confidence intervals for small and large samples, Hypotheses Testing of process parameters with specific references to industrial production, Correlation and Regression Analysis.

COURSE OBJECTIVES

At the end of this course, the student will:

- Identify key concepts of collection and presentation of statistical engineering data and sampling
- Identify, analyse and apply descriptive measures and graphical methods in engineering statistics
- Identify, analyse and apply key parametric estimation concepts in statistical engineering applications, including the properties of a good estimator, and minimum variance unbiased estimator
- Identify, analyse and apply confidence intervals for small and large samples in statistical engineering applications
- Identify, analyse and apply key hypotheses testing concepts in statistical engineering applications
- Identify, analyse and apply key correlation and regression analysis concepts in statistical engineering applications
- Identify key non parametric estimation approaches in statistical engineering applications

COURSE LEARNING OUTCOMES

On successful completion of this course, students are expected to develop knowledge and understanding of:

- Collection and Presentation of data,
- Descriptive measures,
- Statistical Sampling,
- Parametric and Non parametric estimation
- Properties of a good estimator, and Minimum Variance Unbiased estimator,
- Confidence intervals for small and large samples,
- Hypotheses Testing,
- Correlation and Regression Analysis.

CONTRIBUTION OF THE COURSE TO MEETING THE REQUIREMENTS OF CRITERION 5

Mathematics and Basic Sciences: 40%
Engineering Science: 40%
Engineering Design: 0%
General Education: 20%

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES

	Level of Contribution		
Student Outcomes	**Moderate**	**High**	**NO**
1. an ability to identify, formulate, and solve complex problems by applying principles of engineering, science, and mathematics	☐	☑	☐
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	☐	☐	☑
3. an ability to communicate effectively with a range of audiences	☐	☑	☐
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	☐	☐	☑
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	☐	☐	☑
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	☐	☑	☐
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	☐	☐	☑

GRADING CRITERIA

Exams: All examinations will be based on lectures, tutorials, assigned readings, and other related work.

To pass these exams students will need to have studied the material well in advance in order to understand the concepts, procedures and techniques. All EMU, academic integrity, ethics and disciplinary procedures apply to all assessment activities of this course. Descriptions of these assessments are as following:

Quizzes: There will be 4 quizzes, dates of which will be announced.

Midterm Exam: There will be one midterm examination that covers all the material up to the date of the examination. It will be scheduled for a day in the designated mid-term exams week.

Final Exam: Like the midterm exam, the final exam will be scheduled for a day in the designated final exams week.

Make-up Exam: Make-up examination will only be offered to those students who missed the final or midterm exam and provided valid documentation (medical report etc.) for their absence within three working days at the latest after the examination date.

METHOD OF ASSESSMENT

Although the student's overall grade will be based on the general assessment of the instructor, the following percentages may give an idea about the relative importance of various assessment tools:

Quizzes: 20%
Midterm Exam: 35%
Final Exam: 45%

Letter grade equivalents of numerical performances will be announced by the Registrar's Office after the last day for the submission of letter grades.

NG (Nil-grade) Policy: The following conditions will result in the student getting an NG grade from this course:

1. Not attending the Final Exam without a valid excuse.
2. Not attending the Midterm Exam without a valid excuse.
3. Cheating and/or plagiarism during the exams, and/or the quizzes.

LEARNING / TEACHING METHOD

The teaching/learning method adopted this semester will be in-class lectures, unless otherwise stated, as per the course of the COVID-19 pandemic. The lectures will also be provided online, through MS Teams, for those students that are unable to attend the in-class lectures due to the COVID-19 pandemic. Tutorials will also be delivered, providing additional solved examples and other supplementary information as applicable. All relevant course materials will be provided via the course page implemented on MS Teams. The students will be provided with updates during the lectures and through posts on the course page on MS Teams and the LMS. The students are expected to regularly monitor the course page on MS Teams, and the LMS, and to regularly check their emails for updates.

COURSE TEXTBOOKS

- Walpole RE, Myers R, Myers SL, Ye K, "Probability & Statistics for Engineers & Scientists", Global/9th ed., Pearson, (2016).

SUPPLEMENTARY READING

- Montgomery D C and Runger G C, "Applied Statistics and Probability for Engineers, 7th Ed." Wiley, 2019.

WEEKLY COURSE PLAN

IENG385 - Statistical Applications in Engineering Fall 2021/22 Term Plan					
Week	**Week Commencing**	**Slides**	**Module**	**Textbook Ref.***	**Complete**
WK1	04-Oct	L00 & L01	Course Policy & Introduction and Fund. Concepts	Chapter 1	
WK2	11-Oct	L02	Collection and Presentation of data	Chapter 1	
WK3	18-Oct	L03	Sampling Distributions and Data Descriptions	Chapter 8	
WK4	25-Oct	L03	Sampling Distributions and Data Descriptions	Chapter 8	Quiz 1
WK5	01-Nov	L04	Parametric estimation, interval estimation and properties of good estimators	Chapter 9	
WK6	08-Nov	L04	Parametric estimation, interval estimation and properties of good estimators	Chapter 9	
WK7	15-Nov	L04	Parametric estimation, interval estimation and properties of good estimators	Chapter 9	Quiz 2
MTW	22-Nov	**Midterm Exams**			
MTW	29-Nov				
WK8	06-Dec	L05	Tests of Hypotheses	Chapter 10	
WK9	13-Dec	L05	Tests of Hypotheses	Chapter 10	
WK10	20-Dec	L05	Tests of Hypotheses	Chapter 10	Quiz 3
WK11	27-Dec	L06	Correlation and Regression Analysis	Chapter 11	
WK12	03-Jan	L06	Correlation and Regression Analysis	Chapter 11	
WK13	10-Jan	L07	Introduction to Non Parametric Statistics	Chapter 16	Quiz 4
FW	17-Jan	**Final Exams**			
FW	24-Jan				

Course Textbook*

Walpole RE, Myers R, Myers SL, Ye K, “Probability & Statistics for Engineers & Scientists”, Global/9th ed., Pearson, (2016).

ACADEMIC HONESTY, PLAGIARISM & CHEATING

This is intentionally failing to give credit to sources used in writing regardless of whether they are published or unpublished. Plagiarism (which also includes any kind of cheating in exams) is a disciplinary offence and will be dealt with accordingly. According to university by laws cheating and plagiarism are serious offences punishable with disciplinary action ranging from simple failure from the exam or project/report, to more serious action (suspension from the university for up to one semester). Disciplinary action is written in student records and may appear in student transcripts. Any act not suitable for a university student will not be tolerated and may lead to formal disciplinary action. Example of this are: getting someone else to take the examinations for you, misrepresentation of your own answer sheet as another’s work, cheating, knowingly assisting other students to cheat, abusing the tolerance or breaking the discipline of the class.