

<b>Faculty</b>	<b>Faculty of Engineering</b>		
<b>Program</b>	<b>B.Sc. in Civil Engineering</b>	<b>Required</b>	
	<b>B.Sc. in Computer Engineering</b>	<b>Required</b>	
	<b>B.Sc. in Electrical-Electronics Engineering</b>	<b>Required</b>	
	<b>B.Sc. in Industrial Engineering</b>	<b>NA</b>	
	<b>B.Sc. in Mechanical Engineering</b>	<b>Required</b>	
<b>Semester</b>	<b>Spring 2016-2017</b>		

<b>Course Code</b>	MATH 224			
<b>Course Title in English</b>	Probability and Statistics for Engineering			
<b>Course Title in Turkish</b>	Mühendislik için Olasılık ve İstatistik			
<b>Language of Instruction</b>	English			
<b>Type of Course</b>	Flipped Classroom			
<b>Level of Course</b>	Undergraduate			
<b>Course Category (by % of Content)</b>	Basic Science	Basic Engineering	Engineering Design	General Education
	100	-	-	-
<b>Semester Offered</b>	Spring			
<b>Contact Hours per Week</b>	Lecture: 3 hours	Recitation: -	Lab:-	Other:-
<b>Estimated Student Workload</b>	150 hours per semester.			
<b>Number of Credits</b>	6 ECTS			
<b>Grading Mode</b>	Standard Letter Grade			
<b>Pre-requisites</b>	MATH115			
<b>Expected Prior Knowledge</b>	Prior knowledge in calculus is expected.			
<b>Co-requisites</b>	None			
<b>Registration Restrictions</b>	Only Undergraduate Students			
<b>Overall Educational Objective</b>	To learn the fundamentals of probability and statistics and their applications in engineering problems.			
<b>Course Description</b>	This course provides a comprehensive introduction to probability theory and its applications to engineering. The following topics are covered: definition and rules of probability; random variables and their expected values, mean, variance and standard deviation of a probability distribution; discrete probability distributions: the Bernoulli, Binomial, geometric and Poisson distributions; continuous probability distributions: the uniform, exponential and normal distributions; multivariate probability distributions; statistics, sampling and sampling distributions; estimation; hypothesis testing; simple regression.			
<b>Course Description in Turkish</b>	Bu derste olasılık kuramına ve mühendislik uygulamalarına kapsamlı bir giriş sağlanmaktadır. Derste işlenen konular arasında; olasılık tanımı ve kuralları; rassal değişkenler ve beklenen değerleri, olasılık dağılımının ortalama değer, varyans ve standart sapması; ayrık olasılık dağılımları: Bernoulli, Binom, geometrik ve Poisson dağılımları; sürekli olasılık dağılımları: düzgün, üstsel ve normal dağılımlar; çoklu olasılık dağılımları; istatistik, örnekleme ve örnekleme dağılımları; kestirim; hipotez testleri, basit bağılanım bulunmaktadır.			
<b>Course Learning Outcomes and Competences</b>	Upon successful completion of the course, the learner is expected to be able to: 1. Understand fundamentals of probability and statistics, 2. Know and analyze important probability distributions, 3. Apply statistical methods to solve engineering problems.			

**Relation to Student Outcomes and Competences: N=None S=Supportive H=Highly Related**

<b>Relationship of the Course with the Student Outcomes and Competences</b>	<b>Level</b> N/S/H (Related Learning Outcomes)	<b>Assessed by</b>
(a) an ability to apply knowledge of mathematics, science, and engineering	H (1,2,3)	Exam, Flipped Classroom Practice
(b) an ability to design and conduct experiments, as well as to analyze and interpret data		
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability		
(d) an ability to function on multidisciplinary teams		
(e) an ability to identify, formulate, and solve engineering problems		
(f) an understanding of professional and ethical responsibility		
(g) an ability to communicate effectively		
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context		
(i) a recognition of the need for, and an ability to engage in life-long learning		
(j) a knowledge of contemporary issues		
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	S (3)	Flipped Classroom Practice

Prepared by and Date	Asst. Prof. Dr. Ahmet Serdar Tan / September 2016	
Name of Instructors	Asst. Prof. Dr. Ahmet Serdar Tan	
Course Contents	Week	Topic
	1.	Definition and rules of probability
	2.	Definition and rules of probability
	3.	Fundamentals of random variables
	4.	Discrete probability distributions
	5.	Discrete probability distributions
	6.	Continuous probability distributions
	7.	Continuous probability distributions
	8.	Multivariate probability distributions
	9.	Multivariate probability distributions
	10.	Statistics, sampling and sampling distributions
	11.	Estimation
	12.	Hypothesis Testing
	13.	Hypothesis Testing
	14.	Simple regression
	15.	Final Examination Period

	<b>16. Final Examination Period</b>															
Required/Recommended Readings	<p>Required: Probability and Statistics for Engineers, R. L. Scheaffer, J.T. McClave, Duxbury Press, 5th Edition, 2010</p> <p>Recommended: Introduction to Probability and Statistics for Engineers and Scientists, S. M. Ross, John Wiley&amp; Sons, 4th Edition, 2009</p> <p>Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences, J.S. Milton, McGraw-Hill, 4th Edition, 2002</p>															
Teaching Methods	Lectures/contact hours using "flipped classroom" as an active learning technique															
Homework and Projects	-															
Laboratory Work	-															
Computer Use	-															
Other Activities	-															
Assessment Methods	<p>Types of assessment:</p> <table border="1"> <thead> <tr> <th></th> <th>Number</th> <th>Ratio (%)</th> </tr> </thead> <tbody> <tr> <td>Midterm Exams</td> <td>2</td> <td>40 (each contributing 20%)</td> </tr> <tr> <td>Flipped Classroom Practice</td> <td>14</td> <td>20</td> </tr> <tr> <td>Final Exam</td> <td>1</td> <td>40</td> </tr> <tr> <td>Total</td> <td></td> <td>100</td> </tr> </tbody> </table>		Number	Ratio (%)	Midterm Exams	2	40 (each contributing 20%)	Flipped Classroom Practice	14	20	Final Exam	1	40	Total		100
	Number	Ratio (%)														
Midterm Exams	2	40 (each contributing 20%)														
Flipped Classroom Practice	14	20														
Final Exam	1	40														
Total		100														
Course Administration	<p><b>Instructor's office:</b> 5<sup>th</sup> Floor  <b>office hours:</b> Tue 16:00-17:00, Thu 16:00-17:00  <b>email address:</b> tans@mef.edu.tr</p> <p><b>Rules for attendance:</b> Classroom practice contributes to 20% of the final grade. Students attending less than 70% of the lectures will be graded FZ.</p> <p><b>Missing a midterm:</b> Provided that proper documents of excuse are presented, each missed midterm by the student will be given the grade of the final exam. No make-up will be given.</p> <p><b>Missing a final:</b> Faculty regulations.</p> <p><b>A reminder of proper classroom behavior, code of student conduct:</b> YÖK Regulations</p> <p><b>Statement on plagiarism:</b> YÖK Regulations  <a href="http://3fcampus.mef.edu.tr/uploads/cms/webadmin.mef.edu.tr/4833_2.pdf">http://3fcampus.mef.edu.tr/uploads/cms/webadmin.mef.edu.tr/4833_2.pdf</a></p>															

ECTS Student Workload Estimation	Activity	No/Weeks	Hours			Calculation	Explanation
		No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
	Lecture/Flipped Classroom	14	2	3	2	98	A*(B+C+D)
	Midterm(s)	2	12	2		28	A*(B+C+D)
	Final Examination	1	22	2		24	A*(B+C+D)
	Total Workload					150	
	Total Workload/25					6	
	ECTS					6	

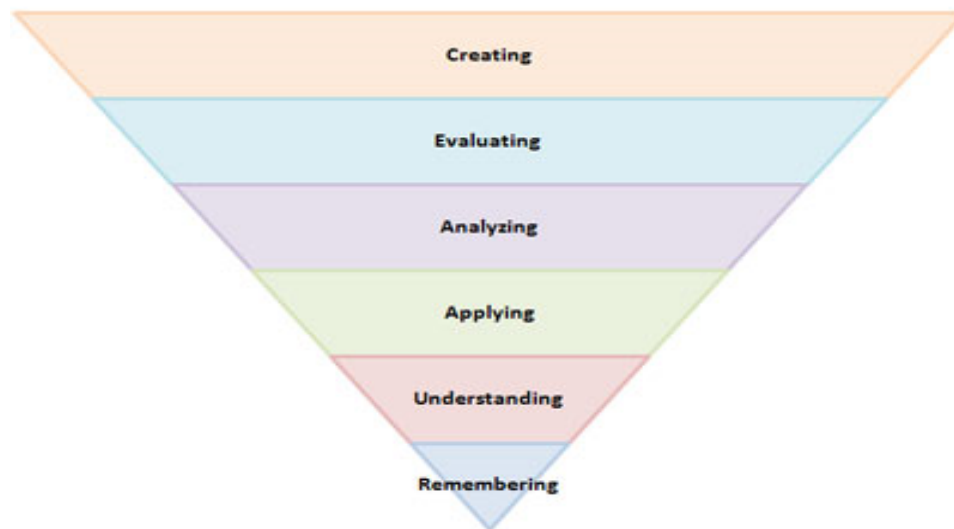
**PROGRAM CRITERIA**

### **Electrical and Electronics Engineering Program Criteria**

1. Breadth in electrical-electronics engineering practice, analysis and design with 16 required course, and depth in one or more fields with 16 electives.
2. Knowledge of mathematics, including differential and integral calculus, basic sciences, computer science, and engineering sciences that is necessary for analysis and design of complex electrical and electronic devices, software, and systems containing hardware and software components.
3. Knowledge of probability and statistics, including application to Electrical and Electronics engineering; knowledge of advanced mathematics, including differential equations, linear algebra, complex variables, and discrete mathematics.

**Key verbs for cognitive domain in writing learning outcomes and competences:**

## Bloom's Taxonomy



Revised edition by Lorin Anderson (a student of Bloom)

**Key Verbs:**

Remembering: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.

Understanding: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.

Applying: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.

Analyzing: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.

Evaluating: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.

Creating: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.

**Key verbs for affective domain in writing learning outcomes and competences:**

Receiving Phenomena: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.

Responding to Phenomena: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.

Valuing: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.

Organizing: adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.

Internalizing values: acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.