OSTİM TECHNICAL UNIVERSITY
ENGINEERING FACULTY
ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE SCHEDULE FORM
2023-2024 SPRING

EEE306 Communications Systems

Course Unit Name	Course Unit Code	Semester	Lecture Hr	Practice Hr	Lab Hr	Credit	ECTS
Communication Systems	EEE306	2	4	0	0	4	5

Course Details	
Language of Instruction	English
Level of Course Unit	Bachelor's Degree
Program	Electrical and Electronics Engineering
Mode of Delivery	Face to Face, online
Type of Course Unit	Compulsory
Objectives of the Course	Introduction to and overview of analog and digital communications. The fundamental physics and mathematics of communication, metrics and limitations of telecommunication systems. This course will ensure knowledge for analyzing the basic analog and digital communication systems. Understanding the communication engineering fundamentals.
Course Content	Signal and Systems Review, Fourier Transform, Analog Modulation and Performance Metrics, Amplitude Modulation, Amplitude Demodulation, Coherent and Envelope Detectors, Phase and Frequency Modulation Systems, Phase and Frequency Modulation Systems, Multiplexing, Noise and Random Processes, Digital Modulation and Performance Metrics, Shannon's Limit, Digital Modulation Systems, Digital Modulation Design Process, M-ary Modulation Performance and Spectral Efficiency, Digital Coding, Compression, and Error Correction
Course Method and Techniques	Lecture/Presentation, problem solving, homework, question/answer
Prerequisites and Corequisities	-
Course Coordinator	Prof. Dr. Yalçın Ata
Name of Lecturer(s)	Prof. Dr. Yalçın Ata
Assistants	Hatice Kübra Ersarı
Work Placement(s)	-

Recommended or Required Reading
Michael P. Fitz, Fundamentals of Communications Systems, McGraw-Hill, 2007. J.G. Proakis & Masoud Salehi, Fundamentals of Communication Systems (2edition), Pearson, 2014. Simon Haykin, Communication Systems, John Wiley&Sons, Inc, 2001.

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	: X	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Profession	:

Weekly Detailed Course Contents		
Week No	**Topics**	**Pre-study & Materials**
1	Introduction, Signal and Systems Review	Chapter 1&2 (Fitz)
2	Fourier Representations	Chapter 2 (Fitz)
3	Probability and Random Variables, Complex baseband representation	Chapter 3&4 (Fitz)
4	Analog Communication Basics, Analog Modulation and Performance Metrics, Amplitude Modulation	Chapter 5&6 (Fitz)
5	Amplitude Demodulation, Coherent and Envelope Detectors	Chapter 6 (Fitz)
6	Angle Modulation, Phase and Frequency Modulation Systems	Chapter 7 (Fitz)
7	Angle Modulation, Phase and Frequency Modulation Systems, Multiplexing	Chapter 7&8 (Fitz)
8	Noise in Communication Systems and Random Processes	Chapter 9&10&11 (Fitz)
9	Midterm Exam	-
10	Digital Modulation and Performance Metrics, Shannon's Limit	Chapter 12 (Fitz)
11	Digital Modulation Systems, ASK, PSK,	Chapter 7&8 (Proakis)
12	Midterm Exam	-
13	Digital Modulation Systems, FSK, QAM	Chapter 7&8 (Proakis)
14	Digital Modulation Systems, PCM, Delta modulation, M-ary Modulation Performance and Spectral Efficiency	Chapter 7&8 (Proakis)
15	Digital demodulation	Chapter 9 (Proakis)
16	Final Exam	-

Course Learning Outcomes	
No	**Learning Outcomes**
C1	learning analog communication systems
C2	learning basic digital communication systems
C3	differentiating analog and digital representation and transmission of information

C4	understanding the concept of "noise" in analog and digital communication systems
C5	understanding the trade-offs (in terms of bandwidth, power, and complexity requirements) between basic analog and digital communication systems
C6	being aware of design basic analog or digital communication systems
C7	utilizing the Fourier transform to analyze communication systems.
C8	using complex exponential notation to describe signals and systems and describing how signals are used in applications
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Programme Outcomes	
No	**Outcomes**
P01	An ability to identify, formulate, and solve complex electrical and electronics engineering problems by applying principles of engineering, science, and mathematics.
P02	Ability to identify, define, formulate and solve complex electrical and electronics engineering problems; ability to select and apply appropriate analysis and modeling methods for this purpose.
P03	The ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; ability to apply modern design methods for this purpose.
P04	Ability to develop, select and use modern techniques and tools necessary for the analysis and solution of complex problems encountered in electrical and electronics engineering applications; ability to use information technologies effectively.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the investigation of complex electrical and electronics engineering problems or discipline-specific research topics.
P06	Ability to work effectively in disciplinary and multi-disciplinary teams; individual working skills.
P07	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language; ability to write effective reports and understand written reports, to prepare design and produce reports, to make effective presentations, to give and receive clear and understandable instructions.
P08	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P09	Behaving in accordance with ethical principles, awareness of professional and ethical responsibility; knowledge of standards used in engineering practice.
P10	Knowledge of business practices such as project management, risk management and change management; awareness of entrepreneurship, innovation; information about sustainable development.
P11	Information about the effects of electrical and electronics engineering practices on health, environment and safety in universal and social dimensions and the problems of the era reflected in the field of engineering; awareness of the legal consequences of engineering solutions.

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance		
Lab		
Practice		
Fieldwork		
Course-specific internship (if any)		
Quiz/Studio/Criticize		

Homework	3	15
Presentation		
Project		
Report		
Seminar		
Midterm Exam	2	45
Final Exam	1	40
	Total	**%100**
Contribution of Midterm Studies to Success Grade		
Contribution of End of Semester Studies to Success Grade		
	Total	**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hr)**	**Total Work Load**
Weekly Theoretical Course Hrs (Including the exam week: 16 x total course hours)	16	4	64
Lab			
Practice			
Course-specific internship (if any)			
Fieldwork			
Out-of-class study time			
Presentation/Seminar Preperation			
Project			
Report			
Homework	3	5	15
Quiz/Studio/Criticize			
Midterm Exam and Preperation for Midterm	2	15	30
Final Exam and Preperation for Final Exam	1	20	20
Total Workload			**129**
ECTS Credit	**(129/25) =**		**5,16**

Contribution of Course Learning Outcomes to Programme Outcomes											
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant											
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**
C1	4	5	4	4	2	2	1	1	1	1	1
C2	4	5	4	4	2	2	1	1	1	1	1
C3	4	4	3	3	3	1	1	1	1	1	1
C4	4	4	4	4	2	1	1	1	1	1	1
C5	2	4	4	2	1	1	1	1	1	1	1
C6	3	3	4	4	2	2	1	1	1	1	1
C7	5	4	2	2	1	1	1	1	1	1	1
C8	3	3	2	2	1	1	1	1	1	1	1