Course Details				
Course Name	Telecommunications II			
Language of Instruction	English			
Course Level	Short Cycle ( )	First Cycle (x)	Second Cycle ( )	Third Cycle ( )

Course Type		Course Code
Compulsory (x)	Elective ( )	EE451

Theory (hour/week)	Application (hour/week)	Total (hour/week)	Term	Local Credit	ECTS Credit
3	0	3	Fall	3	5

Programmes Offering the Course	1. Electrical and Electronics Engineering
Course Objectives	The objective of this course is to introduce the basics of digital communication techniques. In this context, different types of digital modulation techniques will be covered. Information theoretical analysis of communication systems and channel coding techniques will be discussed as well.
Course Content	Introduction to digital communications; the sampling theorem and quantization, Pulse Code Modulation, Delta Modulation, digital modulation methods in an additive white Gaussian noise channel, introduction to information theory, channel coding techniques.
Prerequisites	
Electives Recommended	-
Learning Outcomes	1. To understand the basics of digital communication techniques 2. To be able to represent information signals in digital form 3. To be able to apply different digital modulation techniques 4. To understand the fundamentals of information theory 5. To be able to apply channel coding techniques effectively
Course Lecturer(s)	1. Asst.Prof.Dr. Mümtaz Yılmaz
Course Assistant(s)	

Teaching Methods		
(x) Statement	(x) Experience	(x) Demonstration-Remodelling
(x) Discussion	(x) Case Study	(x) Project based learning
(x) Problem solution	(x) Individual Study	( ) …….
( ) …….	( ) …….	( ) …….

Course Book / Recommended Sources	

	Requirements	Number	Percentage
Assessment and Evaluation	Attendance		
	Quizzes	4	%10
	Midterms	1	%30
	Assignments/ Seminars	5	%10
	Term Paper/ Project		
	Application (Lab., Workshop, Field work etc.)		
	Other (……..)		
	Term	1	%50
	Total		**100 %**

Weekly Subjects and Related Preparation Studies		
Week	**Subjects**	**Related Preparation**
1	Introduction to digital communication systems,	
2	The Sampling Theorem, Scalar Quantization, Vector Quantization, Encoding	
3	Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation	
4	Geometric Representation of Signal Waveforms, Binary Antipodal Signaling, Binary Orthogonal Signaling	
5	Correlation-Type Demodulator, Matched-Filter-Type Demodulator, The Performance of the Optimum Detector for Binary Signals,	
6	M-ary Digital Modulation, The Optimum Receiver, A Bound on the Probability of Error	
7	M-ary Pulse Amplitude Modulation, Probability of Error for M-ary PAM	
8	Midterm	
9	Phase-Shift Keying, Geometric Representation, Detection of PSK Signals, Probability of Error for PSK Modulation	
10	Quadrature Amplitude-Modulated Digital Signals, Geometric Representation, Demodulation and Detection, Probability of Error	
11	Frequency-Shift Keying, Demodulation, Optimum Detector, Probability of Error.	
12	Measure of Information, Joint and Conditional Entropy, Mutual Information, Differential Entropy	
13	The Huffman Source Coding Algorithm, Channel Capacity	
14	Linear Block Codes, Decoding and Performance of Linear Block Codes,	
15	Convolutional Codes, Basic Properties, Maximum Likelihood Decoding of Convolutional Codes	
16	Final exam	

	Learning Outcomes *									
Programme Outcomes	01	02	03	04	05	06	07	08	09	10
PO 1 ability to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study	3	3	3	3	3					
PO 2 ability to complete and implement “limited or incomplete data” by using the scientific methods.	4	4	4	4	4					
PO 3 ability to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them	4	4	4	4	4					
PO 4 ability to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process	-	-	-	-	-					
PO 5 gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering	3	3	3	3	3					
PO 6 ability to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process	4	4	4	4	4					
PO 7 gain high level ability to define the required information and data	5	5	5	5	5					
PO 8 ability to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations	-	-	-	-	-					
PO 9 systematic and clear verbal or written transfer of the process and results of studies at national and international environments	-	-	-	-	-					
PO 10 aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement	-	-	-	-	-					
PO 11 aware of new and developing application of profession and ability to analyze and study	3	3	3	3	3					

on those applications										
PO 12 ability to interpret engineering application's social and environmental dimensions and it's compliance with the social environment	-	-	-	-	-					

ECTS – Workload Table				
Activities	**Number**	**Preparation**	**Duration (Hour)**	**Total Workload**
Theory	14	1	3	56
Application	-	-	-	-
Assignments / Seminars	2	2	-	4
Term Paper / Project	1	12	3	15
(Lab., Workshop, Field work etc.)	-	-	-	-
Study Hours out of class	12	-	2	24
Quizzes	4	-	0.5	2
Midterms	1	10	2	12
Final	1	10	2	12
			Total Workload (Hour)	125
			ECTS Credits	5

* - : N/A, 1: Lowest, 2: Low, 3: Average, 4: High, 5: Highest