SIGNALS AND SYSTEMS I

1	Course Title:	SIGNALS AND SYSTEMS I	
2	Course Code:	EEM2401	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	3	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. ERDOĞAN DİLAVEROĞLU	
15	Course Lecturers:	Prof. Dr. Erdoğan Dilaveroğlu Yrd. Doç. Dr. Ersen Yılmaz	
16	Contact information of the Course Coordinator:	Prof. Dr. Erdoğan Dilaveroğlu E-mail: dilaver@uludag.edu.tr Tel: (224) 294 2012 Elektrik-Elektronik Müh. Böl., 3. Kat, 324.	
17	Website:		
18	Objective of the Course:	Giving to the students the fundamentals of the signals and systems area of electrical engineering. Also, preparing the students to some higher level courses in such areas of signal processing, circuits, communication and control.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Describe signals mathematically and perform mathematical operations on signals.
		2	Be familiar with commonly used signals such as sinusoidal signals, complex exponentials, the impulse and step functions, and classify signals as continuous-time or discrete-time, as periodic and non-periodic, as energy or power signals, and as having even or odd symmetry.
		3	Understand various system properties such as causality, time-invariance, linearity and stability.
		4	Understand the convolution sum and the convolution integral operations and their implication for analysis of linear time invariant systems.
		5	Compute the Fourier series (and its inverse) of periodic continuous time and discrete time signals from definitions and using the properties of the Fourier series.
		6	Compute the Fourier transform (and its inverse) of continuous time signals from definitions and using the properties of the Fourier transform.
		7	Understand the intuitive meaning of frequency domain and the importance of analyzing and processing signals in the frequency domain.
		8	Understand the application of Fourier analysis to ideal filtering.

	9	Use basic mathematics including calculus, complex variables and algebra for the analysis and design of linear time invariant systems used in engineering.
	10	

21	Course Content:

Course Content:

Week	Theoretical	Practice
1	Presentation and organization of the course. Mathematical review: Complex numbers.	
2	Mathematical review (continued): Polar representation of complex numbers and the triangle inequality. De Moivre's Theorem and roots. The complex exponential, Euler's formula.	
3	Continuous and discrete time signals, exponential and sinusoidal signals, impulse and step functions.	
4	Continuous and discrete time systems, basic system properties.	
5	Linear and time invariant (LTI) discrete time systems: The convolution sum.	
6	LTI continuous time systems: The convolution integral.	
7	Properties of LTI systems, difference and differential equations.	
10	Properties of continuous and discrete time systems; filtering.	
11	Review and discussion of solutions to homework problems.	
12	Derivation of the continuous time Fourier transform.	
13	Properties of the continuous time Fourier transform, convolution and multiplication	
14	Review and discussion of solutions to homework problems.	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	5.00	70.00
Homeworks	14	5.00	70.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	1.50	1.50
Others	0	0.00	0.00
Final Exams	1	1.50	1.50
Total Work Load			185.00
Total work load/ 30 hr			6.17
ECTS Credit of the Course			6.00

22	Textbooks, References and/or Other Materials:	Signals and Systems, Alan V. Oppenheim, Alan S. Willsky, with S. Hamid Nawab, 2nd edition, (Prentice Hall, 1997)

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	

24	ECTS / WORK LOAD TABLE

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
ÖK5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK9	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**			**4 High**			**5 Very High**				