

## ELEC4706 COURSE CATALOG INFO

<b>Course Code : ELEC4706</b>				<b>Course Name : Wireless Communications</b>			
Semester	Lecture (Le+T+L)	Local Credit	ECTS	Language	Category	Instructional Methods	Prerequisites
7 or 8	(3+0+0)	3	5	English	Elective	Lecture	ELEC3701
<b>Course Content</b>	Overview of wireless communications. Path loss, shadowing and fading. Empirical and statistical channel models. Digital modulation techniques and bit error rate analysis for fading channels. Spread spectrum and OFDM. Multiple access techniques: FDMA, TDMA, CDMA, OFDMA. Frequency reuse and handoff. Trunking and interference. Wireless communication standards..						
<b>Course Outcomes</b>	<b>CO 1.</b> Mathematically model physical characteristics of wireless channels <b>CO 2.</b> Analyze and design, at a system level, state-of-the-art wireless communication systems <b>CO 3.</b> Perform independent research and simple simulations on state-of-the-art wireless technologies <b>CO 4.</b> Use MATLAB, for modeling, simulation, and design of wireless communication systems						

<b>COURSE PLAN</b>	
W1	Introduction to wireless communication systems
W2	Mobile Radio Propagation: Large-scale path loss (1/2)
W3	Mobile Radio Propagation: Large-scale path loss (2/2)
W4	Mobile Radio Propagation: Small-scale fading and multipath (1/2)
W5	Mobile Radio Propagation: Small-scale fading and multipath (1/2)
W6	Linear modulation techniques (1/3)
W7	Linear modulation techniques (2/3)
W8	Linear modulation techniques (3/3)
W9	Midterm
W10	Spread spectrum modulation techniques
W11	Multiple access techniques: FDMA, TDMA and CDMA
W12	The cellular concept: System design fundamentals (1/2)
W13	The cellular concept: System design fundamentals (2/2)
W14	Project Presentation and Report

**COURSE ASSESMENT AND ECTS WORK LOAD**

Type of Work	Count	ECTS WORK LOAD	
		Time (Hour)(Including prep. time)	Work Load
Attendance	14	3	42
Final Exam	1	15	15
Quizzes			0
Term project	1	20	20
Reports			0
Final Project			0
Seminar			0
Assignments	5	1	5
Presentation			0
Midterms	1	15	15
Project			0
Laboratory		0	0
Tutorial		0	0
Other(Self study, Paper reviews)	14	2	28
		<b>Total work load</b>	125
		<b>Total work load/25</b>	5
		<b>ECTS Credit</b>	5

**PROGRAM OUTCOMES - COURSE OUTCOMES RELATIONS**

<b>PO</b>	<b>Program Outcomes</b>	<b>CO</b>
<b>1</b>	<b>1.1.</b> Adequate knowledge in fundamentals of mathematics (algebra, differential equations, integrals, probability etc), science (physics, chemistry, biology etc.) and computer science (programming and simulation);	
	<b>1.2.</b> ability to use theoretical and applied knowledge in these areas in complex engineering problems.	
<b>2</b>	<b>2.1.</b> Ability to identify, formulate, and solve complex engineering problems;	1,..,4
	<b>2.2.</b> ability to select and apply proper analysis and modeling methods for this purpose.	1,..,4
<b>3</b>	<b>3.1.</b> Ability to design and integrate components of a complex system or process, as they relate to Electrical and Electronics Engineering discipline, under realistic constraints and conditions, in such a way as to meet desired requirements;	
	<b>3.2.</b> ability to apply modern design methods.	
<b>4</b>	<b>4.1.</b> Ability to devise, select, and use techniques and tools needed for analyzing and solving complex problems encountered in engineering practice;	
	<b>4.2.</b> ability to employ information technologies effectively.	
<b>5</b>	<b>5.1.</b> Ability to design experiments,	
	<b>5.2.</b> ability to conduct experiments, gather, analyze and interpret data.	
<b>6</b>	<b>6.1.</b> Ability to work in intra-disciplinary teams;	
	<b>6.2.</b> ability to work in multi-disciplinary teams;	
	<b>6.3.</b> ability to take individual responsibilities.	
<b>7</b>	<b>7.1.</b> Ability to effectively communicate via written and oral means;	
	<b>7.2.</b> knowledge of at least one foreign language;	
	<b>7.3.</b> ability to write effective reports and comprehend written reports;	
	<b>7.4.</b> ability to write design and manufacturing reports	
	<b>7.5.</b> ability to present effectively,	
	<b>7.6.</b> ability to give and follow clear instructions.	
<b>8</b>	<b>8.1.</b> Recognition of the need for lifelong learning;	

	<b>8.2.</b> ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	
<b>9</b>	<b>9.1.</b> Consciousness to behave according to ethical principles, and about professional and ethical responsibility;	
	<b>9.2.</b> knowledge on standards used in engineering practice.	
<b>10</b>	<b>10.1.</b> Knowledge about business life practices such as project management, risk management, and change management;	
	<b>10.2.</b> awareness in entrepreneurship, innovation;	
	<b>10.3.</b> knowledge about sustainable development.	
<b>11</b>	<b>11.1.</b> Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering;	
	<b>11.2.</b> awareness of the legal consequences of engineering solutions.	

<b>Revision Date</b>	<b>Prepared by</b>	<b>Approved by</b>
1.9.2019	Prof. Dr. Onur KAYA	Prof.Dr. Ahmet Aksen
1.6.2021	Asst. Prof. Farshad MIRAMIRKHANI	