

## COURSE PROFILE

<b>Course Number:</b> EE 353	<b>Course Title:</b> Signals and Systems												
<b>Required / Elective:</b> Required (EE)	<b>Pre-requisite:</b> MATH 102												
<p><b>Catalog Description:</b> Time and frequency domain analysis of signals and systems. Periodic signals. Convolution integral. Transmission of information by orthogonal functions. Fourier transforms. Filters. Modulation theory. Analysis of discrete time signals and systems. Discrete time Fourier transform (DFT). Computer applications.</p>													
<p><b>Textbook / Required Material:</b> A.V. Oppenheim, A.S. Willsky, Signals and Systems, 2ed., Prentice Hall, 1997 (ISBN 0-13-814757-4)</p>													
<p><b>Course Structure / Schedule:</b> (4+1+0) 4 / 7 ECTS</p>													
<p><b>Extended Description:</b> Definition and classification of signals; Transformations; Exponential, sinusoidal signals; Impulse and step functions; Systems and basic properties; Convolution sum; Convolution integral; Properties of LTI systems; Differential and difference equations; Response of LTI systems to complex exponentials; Continuous-time Fourier series; Properties of CT Fourier series; Discrete-time Fourier series; CT Fourier transform for periodic signals; Properties of CT Fourier transform; Systems characterized by LTI differential eqn.; Sampling theorem; Reconstruction from samples; Z-transform; region of convergence; inverse z-transform; properties of z-transform; Analysis of LTI systems using z-transform; DT Fourier transform; DTFT for periodic signals; properties of DTFT; Systems characterized by difference equations.</p>													
<b>Design content:--</b>	<b>Computer Usage:</b> Demonstrations and exercises in Matlab												
<p><b>Course Outcomes</b> [Relevant program outcomes in brackets]</p> <p>a) Ability to apply knowledge of mathematics, science, and engineering to problems in electronics engineering [2].</p> <p>b) Ability to identify, formulate and solve engineering problems [6].</p> <p>c) Ability to use the hardware and software based modeling, simulation, design and communication tools necessary for engineering practice [11].</p> <p>Level of Contribution of Course to Program Outcomes: Strong: [2], Average: [6], Some: [11]</p>													
<p><b>Recommended reading</b></p> <ul style="list-style-type: none"> <li>• J. H. McClellan, R. W. Schafer, M. A. Roder, Signal Processing First, Prentice Hall</li> <li>• J. Buck, M. Daniel, A. Singer, Computer Explorations in Signals and Systems using MATLAB</li> </ul>													
<p><b>Teaching Methods</b></p> <p>Pre-readings, lecture, individual exercises, HWs in Matlab, midterm and quiz exams.</p>													
<p><b>Assessment Methods</b> [Related to course outcomes]</p> <p>In class exams for testing i) learn analysis techniques for continuous and discrete time signals and systems in time and transform domains, and ii) gain an understanding of important properties of linear time invariant systems, and their applications [a,b]; HW and Projects for testing ability to use knowledge and skills for engineering practice [c].</p>													
<p><b>Student Workload:</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Preparatory reading</td> <td style="width: 10%; text-align: center;">50</td> <td style="width: 30%;">Assigned exercise studies + HWs</td> <td style="width: 10%; text-align: center;">55</td> </tr> <tr> <td>Lectures and discussion</td> <td style="text-align: center;">60</td> <td>In class exams (midterm + quizzes)</td> <td style="text-align: center;">10</td> </tr> <tr> <td colspan="4" style="text-align: right;"><i>Total: 175 hours (7x25 ects)</i></td> </tr> </table>		Preparatory reading	50	Assigned exercise studies + HWs	55	Lectures and discussion	60	In class exams (midterm + quizzes)	10	<i>Total: 175 hours (7x25 ects)</i>			
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Prepared by: Mustafa Karaman	Revision Date: February 10, 2010												

