WASHINGTON STATE UNIVERSITY
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School of Engineering and Computer Science

ECE 341: Signals and Systems
Master Syllabus

Catalog Data:	**ECE 341: Signals and Systems**; 3 (2-3) credits Discrete and continuous systems, sampling, convolution, Fourier and Z transforms, random signals. Typically offered in Spring.
Class Schedule:	Two lecture hours per week, for one semester.
Laboratory Schedule:	One 3-hour lab session per week, for one semester
Prerequisites by Course:	ECE 321
Prerequisites by Topic:	Understanding of the frequency domain, Laplace and Fourier transforms
Typical Text:	*Linear Systems and Signals*, B.P.Lathi, 2nd Edition, Oxford University Press, ISBN: 978-0-19-515833-5. *Signals and Systems Laboratory with MATLAB*, Alex Palamides and Anastasia Veloni, CRC Press, 2011, ISBN: 978-1-4398-3055-0.
Course Coordinator:	Dr. Praveen Sekhar
Course Objectives:	Students will: 1. Classify signals and systems based upon their properties, and, in particular, understand the implications when a system is linear, time-invariant, and causal. 2. Represent a system as a signal, and find the response of that system to an arbitrary input using convolution. 3. Use Fourier series and Fourier transform methods to determine the frequency domain representation of signals and systems, and apply these techniques to the analysis of filters and amplitude-modulated communication systems. 4. Apply Laplace transform techniques to solve ordinary differential equations, model active and passive circuits, and analyze feedback control systems. 5. Understand the relationship between ordinary differential equation, impulse response function, frequency response function, and transfer function description of a system. 6. Apply probability and statistics in applying random signals.
Topics Covered:	1. Linear time invariant systems 2. Fourier series representation of signals 3. Continuous time Fourier transform 4. Discrete Fourier transform 5. Time and frequency characterization of signals and systems 6. Sampling 7. Laplace transform 8. Z-transform 9. Linear feedback systems 10. Random Signals

Lab Experiments and Activities:		Simulation of continuous and discrete signals in addition to exposure to various signal processing techniques via MATLAB		
Course Outcomes:	Students will be able to:			
	Assessed for Student	1-b. Evaluate and classify signals to identify unstable systems. 1-c. Use Laplace, Z, and Fourier transforms to obtain the frequency domain models to represent signals and systems. 1-d. Applies probability and statistics in analyzing random signals. 3-a. Produce MATLAB based lab reports with discipline-specific conventions. 7-c. Apply new knowledge to understand continuous and discrete systems.		
	Other	1-a. Demonstrate fundamental knowledge of signals and systems in communication systems.		
Relationship of Course to Program:		Meets: Educational Objectives 1, 2, 4 Student Outcomes 1, 3, 7		
Prepared by:		Dr. Praveen Sekhar	Date:	March 9, 2018; 3/21/18 (mb) 11/02/18 JL/mb