Course name	**ECE 30100 Signals and Systems**
Credit and contact hours	(3 cr.) Class 3
Course coordinator's name	Qingxue Zhang
Textbook	Roberts, *Signals and Systems, Analysis Using Transform Methods and MATLAB,* 3rd Edition. ISBN 9781259989650; or; 9780078028120 **References:** • *Lathi, Linear Systems and Signals,* Oxford, Ed. 2, ISBN 0-190515833-4 • A.V.Oppenheim, A. S. Willsky and S. H. Nawab, *Signals and Systems, P*rentice Hall, NJ, 1996, ISBN 0-13-814757-4 • E. W. Kamen and B. S. Heck, *Fundamentals of Signals and Systems Using Matlab,* Prentice Hall, NJ, 1997, ISBN 0-02 361942-2 • H. P. Hsu, *Signals and Systems,* McGraw Hill, 1995, ISBN 0-07-030641-9.
Course information	ECE 30100 Signals and Systems (3 cr.) P: ECE 20200 and MATH 26600. Class 3. Signal and system representation. Fourier series and transforms, sampling and discrete Fourier transforms. Discrete-time systems, difference equation, Z-transforms. State equations, stability, characteristic values and vectors. Continuous-time systems, time and frequency domain analysis. Continuous systems with sampled inputs. **Prerequisites/ Co-Requisite** P: ECE 202 and Math 266 C: None **Required, Elective, or Selected Elective:** EE Required, CE Required
Goals for the course	A student who successfully fulfills the course requirements will have demonstrated: 1. an ability to classify signals (e.g., periodic, even) and systems (e.g., causal, linear) and an understanding of the difference between discrete and continuous time signals and systems. [1] 2. an ability to determine the impulse response of a differential or difference equation. [1] 3. an ability to determine the response of linear systems to any input signal by convolution in the time domain. [1,2,6] 4. an ability to understand the definitions and basic properties (e.g., time-shift, modulation, Parseval's Theorem) of Fourier series, Fourier transforms, bilateral Laplace transforms, Z

	transforms, and the discrete time Fourier transforms, including an ability to compute the transforms and inverse transforms of basic examples using methods such as partial fraction expansions. [1] 5. an ability to determine the response of linear systems to any input signal by transformation to the frequency domain, multiplication, and inverse transformation to the time domain. [1,2,6] 6. an ability to apply the Sampling theorem, reconstruction, aliasing, and Nyquist's theorem to represent continuous-time signals in discrete time so that they can be processed by digital computers. [1,2,6]
List of topics to be covered	1. Introduction to Course, Signals (1 class) 2. Signals and Sequences, MATLAB (2 classes) 3. Continuous-Time Systems (2 classes) review convolution. Covered in 202. 4. Laplace Transform (2 classes) review 5. Frequency Response (2 classes) review 6. Fourier Series and Transforms (2 classes) 7. Continuous State-Space Systems (3 classes) 8. Discrete-Time Systems (3 classes) 9. Z-Transform (3 classes) 10. Discrete Frequency Response (1 class) 11. Discrete Fourier Transform (3 classes) 12. Discrete State-Space Systems (3 classes) 13. Exams (2-3 classes)
Syllabi approved by	Qingxue Zhang
Date of approval	11/12/2021