ECE 351 – Signals & Systems I

Catalog Description: Analytical techniques for continuous-time and discrete-time signal, system, and circuit analysis.

Credits: 3 **Terms Offered:** Fall

Prerequisites: ENGR 203, MTH 256

Courses that require this as a prerequisite: ECE 352, ECE 353, ECE 441, ECE 451, ECE 461, ECE 462, ECE 463, ECE 464, ECE 468, ECE 550

Structure: Three 50-minute lectures per week

Instructors: H. Liu (primary), L. Lucchese (secondary)

Course Content:
- Matlab skills (using help and basic commands, program using vectors & matrices)
- Basic concepts of continuous- and discrete-time signals and systems.
- Time-domain analysis of linear time-invariant (LTI) continuous-time (CT) and discrete-time (DT) systems.
- Frequency-domain analysis of CT/DT signals and LTI systems.
- Fourier representations of mixed signal classes

Measurable Student Learning Outcomes:
At the completion of the course, students will be able to…
1. **Derive** linear models of simple electrical circuits (effective use of differential equations) (ABET: Outcomes A, K, m, n)
2. **Analyze** linear time invariant system responses in time domain using the convolution. (ABET Outcomes: A, K, m, n)
3. **Analyze** continuous time signals and systems in the frequency domain using the Fourier Transform. Determine the Frequency Spectrum of periodic and aperiodic signals using the Fourier Series and Fourier Transform, respectively (ABET Outcomes: A, K, m, n)
4. **Apply** the basic properties of CT and DT signals and systems; express physical signals as mathematical functions, including use of standard signals; use computers and MATLAB to simulate and analyze signals and systems; determine if a system is linear, time-invariant, causal, and memoryless (ABET Outcomes: A, B, m, n)
5. **Perform** signal sampling and reconstruction using Fourier analysis (ABET Outcomes: A, B, K, m, n)

Learning Resources:
- Simon Haykin and Barry Van Veen, *Signals and Systems*, Second Edition, Wiley, 2003 (required)
- MATLAB text: William Palm, *Introduction to MATLAB 7 for Engineers*, McGraw-Hill, 2005 (recommended)

- Signals and systems references (optional): A.V. Oppenheim and A.S. Willsky, *Signals and Systems*, Second Edition, Prentice Hall, 1997; E.W. Kamen and B.S. Heck, *Fundamentals of Signals and Systems*, Second Edition, Prentice Hall, 2000; C. L. Phillips and J. M. Parr, Signals, Systems, and Transforms, Third Edition, Prentice Hall, 2003; M.J. Roberts, Signals and Systems, McGraw Hill, 2004; D.K. Lindner, *Introduction to Signals and Systems*, McGraw Hill, 1999
- MATLAB references (optional): Amos Gilat, *MATLAB: An Introduction with Applications*, Wiley, 2004; Rudra Pratap, *Getting Started with MATLAB*, Oxford University Press, 2002; D.M. Etter, D.C. Kuncicky, and D. Hull, *Introduction to MATLAB 6*, Second Edition, Prentice Hall, 2004; J.R. Buck, M.M. Daniel, A.C. Singer, *Computer Explorations in Signals and Systems Using MATLAB*, Second Edition, Prentice Hall, 2002; S.J. Chapman, *MATLAB Programming for Engineers*, 3rd Edition, Thomson Learning, 2004

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:
http://oregonstate.edu/admin/stucon/achon.htm

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