ENGR 3323 Signals and Systems

Course Catalog Description: This course focuses on techniques to represent signals mathematically, and design systems that process these signals. Topics covered in this course are analysis techniques in continuous-time linear systems, and signal representation including Fourier, Laplace transforms.

Course Prerequisites: ENGR 2303, 2311 and MATH 3103.
Course Co-requisites: ENGR 3331
Prerequisites by Topic: Complex Number, Circuit analysis, Differential Equation

Textbook: "Linear Systems and Signals", 3rd edition by Lathi and Green. ISBN: 978-0190200176

Course Website: http://www.engineering.uco.edu/~mbingabr

Video Lectures: https://www.youtube.com/channel/UCjlqMn0KwY_gF2AxXrZC6Gw

Instructor: Mohamed Bingabr, Professor of Engineering
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Course Meeting Time: MW 9:00 am – 10:15 am,
Course Meeting Location: STEM 120
Office Hours: MW 10:30 am to 11:50 am, and by appointment.

Overall Education Objective: To apply mathematical techniques to signal and system analysis and system design and implementation.

Course Learning Objective: At the end of this course, students should be able to:
1. Classify signals and systems.
2. Mathematically model the system input-output characteristic.
3. Analyze continuous system behavior and its outputs in the time domain.
4. Use Laplace transform for system analysis, realization, and design.
5. Use Fourier series technique for frequency analysis of periodic signals, and system response to these signals.
6. Use Fourier transform technique for frequency analysis of non-periodic signals and system response to these signals.
7. Apply sampling theorem to convert a continuous signal to discrete signal.

Topics Covered:

Subject	Reading
Signals and systems -Size of signal, Classification of signals, Signal Models, Classification of systems, and System models	Ch1
Time-domain analysis of continuous-time systems -System response to internal condition, Unit impulse response, System response to external input, and System stability **Test 1**	Ch2
Continuous-time system analysis using the Laplace transform -Laplace transform and its properties, Analysis of electrical networks, Block diagrams, System realization, Frequency response of an LTIC, and Filter design by placement of poles and zeros **Test 2**	Ch4

Continuous-time signal analysis using the Fourier series -Periodic signal representation by Fourier series, Existence and convergence of the Fourier series, Exponential Fourier Series, and LTIC system response to periodic inputs	Ch6 6.1-6.5
Continuous-time signal analysis using the Fourier transform -Periodic signal representation by Fourier Integral, Some Properties of the Fourier Transform, Signal energy, and Application to Communications	Ch7
Sampling: The bridge from continuous to discrete -The Sampling Theorem, Signal Reconstruction, and Analog-to-Digital (A/D) Conversion	Ch8 8.1-8.3
FINAL	

Distribution of Points:

Attendance	10 %	2 Tests	30 %
Quizzes	30 %	Final	20 %
Homework	10 %		

Grading Scale: A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: 0-59

COURSE EXPECTATION & CONDUCT:

Attendance is expected. You will be responsible for any announcements or notes from class. It is expected that each student will spend a total of 8 hours per week on the course (not including lecture times). I don't expect you to memorize formulas, but I expect you to understand them. So, you are allowed to bring the formula sheets posted on the course website and one page of your own notes to the quizzes and exams. Should you miss a quiz or test due to illness or an emergency, you will be required to give advance notice or provide a doctor's excuse to be allowed to make-up on the tests and quizzes you missed. Make-up tests and quizzes are usually harder than the regular tests and quizzes given during the class. Cheating or academic dishonesty of any kind will not be tolerated.

HOMEWORK:

The reality is this: you will not truly understand the technical concepts by just paying attention to lectures and reading the materials and examples in the textbook. To truly understand engineering concepts, you must solve the homework problems yourself even if you are struggling solving them. For this reason, regular homework assignments will be made. The quizzes will be similar to the homework problems. Homework will be due at the beginning of the class period on the due date. Late homework will be penalized accordingly (25% reduction each day). Homework will be submitted in D2L.

ADA STATEMENT:

"The University of Central Oklahoma complies with Section 504 of the Rehabilitation Act of 1973 and the American with Disabilities Act of 1990. Students with disabilities who need special accommodations should make their requests by contacting the coordinator of Disability Support Services, Kimberly Fields at 974-2549/2516, DSS@uco.edu . The office is located in the Nigh University Center, Room 415. Students should also notify the instructor of special accommodation needs by the end of the first week of class."

STUDENT INFORMATION SHEET

https://www.uco.edu/academic-affairs/files/student-info-sheet.pdf