CMPE 321 Signals and Systems for Computer Engineers

Department: Computer Engineering

Instructor Information:
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Assistant Information:
TBA

Meeting Times and Places:
Mondays 14:30-16:30, Lecture, Classroom 126
Tuesdays 12:30-14:30, Lecture, Classroom 126
Thursdays 16:30-18:30, Tutorial, Classroom 126

Program Name: Computer Engineering	**Program Code:** 25

Course Code:	**Credits:**	**Year/Semester:**
CMPE 321	4	2023-2024 Fall

☒ Required Course ☐ Elective Course (click on and check the appropriate box)

Prerequisite(s):
CMPE 226 Electronics for Computer Engineering

Catalog Description:
Fundamental concepts of signals and systems for computer engineers with focus on discrete-time systems. Sinusoids, complex numbers, spectrum representation, sampling, frequency response, filters, and the z-Transform. Digital signal processing of multimedia signals.

Course Web Page:
https://staff.emu.edu.tr/doguarifler/en/teaching/cmpe321

Textbook(s):
J. H, McClellan, Ronald W. Schaffer, M. A. Yoder, *DSP First*, 2nd ed., Prentice Hall 2015.

Indicative Basic Reading List:
A. V. Oppenheim, A. S. Willsky, Signals and Systems, 2nd Ed., Prentice Hall, 2002.

Topics Covered and Class Schedule:
(4 hours of lectures per week)

Week 1	*Introduction (Ch. 1)*
Week 2	*Sinusoids (Ch. 2)*
Weeks 3-4	*Spectrum Representation (Ch. 3)*
Week 5	*Sampling and Aliasing (Ch. 4)*
Week 6	*FIR Filters (Ch. 5)*
Week 7	*Frequency Response of FIR Filters (Ch. 6)*
Weeks 8-9	*MIDTERMS*
Weeks 10-11	*More on Frequency Response of FIR Filters (Ch. 6)*
Week 12	*DTFT, Windowing, Ideal Filters (Selected sections from Ch. 7), DFT, FFT (Selected sections from Ch. 8)*
Week 13	*z-Transforms (Ch. 9)*
Week 14	*IIR Filters (Selected sections from Ch. 10)*

Lab Schedule:
Please refer to the course Web site for textbook problem assignments of the tutorials.

- Tutorial 1: 19 October 2023
- Tutorial 2: 2 November 2023
- Tutorial 3: 9 November 2023
- Tutorial 4: 14 December 2023
- Tutorial 5: 21 December 2023
- Tutorial 6: 28 December 2023

Course Learning Outcomes:
Upon successful completion of the course, students are expected to have the following competencies:

(1) Use time- and frequency-domain techniques
(2) Understand the use of sinusoids, complex exponentials, and phasors for representing signals.
(3) Represent a signal by its spectrum and analyze/synthesize periodic waveforms by Fourier series.
(4) Perform sampling and reconstruction paying attention to possibility of aliasing.
(5) Analyze discrete-time linear time-invariant filters, perform discrete-time convolution operation.
(6) Understand the use of filters for processing data
(7) Construct frequency response of filters.
(8) Use the z-transform for analyzing discrete-time systems.
(9) Understand the need for infinite impulse response (IIR) filters.
(10) Understand the use of pole-zero diagrams in filter design

	Method	**No**	**Percentage**
Assessment	Midterm Exam	1	40%
	Final Exam	1	50%
	Labs	6	10%

Attendance and Participation: Attendance to every lecture is mandatory.

NG Policy: Receiving zero from or missing any of the components (midterm, final, lab/tutorial) used in determination of the letter grade or attending <50% of the lectures may result in an NG if the accumulated total mark in the course is <50%.

Make-Up Policy: Only one **comprehensive** make-up examination will be given for a missed midterm or final **only under exceptional/extenuating circumstances** (e.g., hospitalization, loss of a close relative, etc.). In these cases, students must submit a petition with related official reports to me within the next three working days following the missed exam. Note that minor ailments are not considered as exceptional/extenuating circumstances. Eligibility to take the make-up exam **will be subject to my final approval.**

Academic Dishonesty: Any conduct that attempts to gain unfair academic advantage is considered academic dishonesty. Copying labs and assignments, cheating during exams, substituting for another person are some examples of academic dishonesty. Cases of academic dishonesty will not be tolerated and will be punished according to EMU's disciplinary policies.

Relationship of the course to Student Outcomes
The course has been designed to contribute to the following student outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Prepared by: Prof. Dr. Dogu Arifler	**Date Prepared:** 23 September 2023