ENSC 245
Signals and Systems
3 Credits

Community College of Baltimore County
Common Course Outline

Description

ENSC 245 – Signals and Systems: expands on the fundamentals of signal and system analysis focusing on discrete-time and continuous-time systems, systems analysis, and representations of linear time-invariant (LTI) systems.

Pre-requisites: ELEI/ENSC 114
Co-requisites: MATH 259

Overall Course Objectives

Upon completion of this course, students will be able to:

1. represent and classify signals and systems;
2. represent and apply singularity functions;
3. obtain the response of a continuous LTI causal system using convolution;
4. obtain the Fourier series expansion of a periodic signal and apply it to continuous LTI systems;
5. plot the Fourier transform for simple aperiodic continuous-time signals;
6. use Laplace transforms to obtain transfer functions to solve continuous LTI systems;
7. analyze continuous LTI systems using state variable formulation to solve the resulting state equations;
8. convert a continuous-time signal to the discrete-time domain to reconstruct it using the sampling theorem;
9. use Z-transforms to solve linear discrete-time systems to obtain transfer functions; and
10. use a matrix computation application to implement signal processing and system analysis.

Major Topics

I. Signals and systems classification
II. Continuous and discrete time equations
III. Transfer functions and time domain solutions
IV. Fourier series
V. Fourier transforms
VI. Laplace transforms
VII. Z-transforms and regions of convergence
VIII. State variables and equations
IX. Sampling theorem

X. Matrix computation application

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- Six homework assignments
- Six quizzes
- Midterm exam
- Final exam

Date Revised: 11/12/2021