# ECE 301 Syllabus

**Course:** ECE 301

**Credit Hours:** 4

**Course Title:** Linear Systems

**Course Description:**

Representation and analysis of linear systems using differential equations: Impulse response and convolution, Fourier and Laplace transformations for discrete time and continuous time signals. Emphasis on interpreting system descriptions in terms of transient and steady state response. Digital Signal Processing.

**Prerequisite(s):** A grade of C or better in ECE220

**Textbook(s) and/or other required material:**

On-line Notes

**Course objectives. By the end of this course, the student should be able to (use demonstrative verbs):**

1. Describe linear time invariant systems in terms of their impulse response, step response, transfer function, system function and differential/difference equations.2. Use any of the descriptions above to obtain the output of continuous and discrete linear time invariant systems. 3. Apply concepts of linear system analysis to specific problems in filter design, communication system design using analog and digital components.4. Calculate the outputs of linear time invariant systems, and analyze these systems in the frequency domain.

**Topics covered:**

(4) Impulse and Impulse Response
(6) Continuous Convolution
(8) Transfer Functions and s-domain Analysis
(4) Control Systems
(4) Signal Spectrum
(8) Frequency Response and and Poles/Zeros
(6) Modulation and Communication Systems
(6) Sampling and Reconstruction
(2) Discrete Time Convolution
(4) Z-Transforms
(6) Basic Digital Filter Design

**Class/laboratory schedule (sessions per week and duration of each session):**

Four 50-minutes lectures per week.

**Contribution of course to meeting the requirements of Criterion 5 - other:**

N/A

**Contribution of course to meeting the requirements of Criterion 5 - math and basic**

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**sciences:**

1 hour

**Contribution of course to meeting the requirements of Criterion 5 - engineering topics:**

3 hours

**Contribution of course to meeting the requirements of Criterion 5 - general education:**

N/A

**Relationship of this course to program learning outcomes:**

| Learning Outcome | Level of Instruction | Related Course Content |
|---|---|---|
| Outcome A | Major | Students must use fundamental principles of math to represent linear time invariant systems.Students see examples of applications of mathematics that are applied to real problems. |
| Outcome B | N/A | |
| Outcome C | Intermediate | In filtering and demodulation problems, students are asked to design the systems which will give desired outputs. |
| Outcome D | N/A | |
| Outcome E | N/A | |
| Outcome F | N/A | . |
| Outcome G | N/A | |
| Outcome H | N/A | |
| Outcome I | N/A | |
| Outcome J | N/A | |
| Outcome K | N/A | |

**Person who last prepared this description and date of preparation:**

**Relationship of this course to program learning outcomes:**

| Learning Outcome | Level of Instruction | Related Course Content |
|---|---|---|

- Ozturk, Hatice Orun (hoo) - Mar 24th, 2010 (03:47pm)