

# ENG201e Linear Systems Analysis and Design

**Level:** 2

**Credit Units:** 5 Credit Units

**Language:** ENGLISH

**Presentation Pattern:** EVERY SEMESTER

**E-Learning:** BLENDED - Learning is done MAINLY online using interactive study materials in Canvas. Students receive guidance and support from online instructors via discussion forums and emails. This is supplemented with SOME face-to-face sessions. If the course has an exam component, this will be administered on-campus.

## **Synopsis:**

This level 2 course is fundamental to the study of many fields that constitute the ever-expanding disciplines of electrical and electronic engineering. This course also serves as the prerequisite for other coursework in the study of filter theory and design, communications, signal processing, and control engineering. On theoretical basis, this course addresses many essential issues in electrical and electronic engineering, including analogue and discrete representation of signals and systems, analysis and design of signals and systems in the time and frequency domains. Frequently used system operations on signals, such as convolution and transformation are also studied.

This course is to provide a theoretical foundation and some practical experience for undertaking the analysis and design of electronic systems and the signals to be processed by such systems.

## **Topics:**

- Introduction to Signals and systems
- Basics of Signals; Basics of Systems
- Introduction of LTI system
- Convolution; System modeling (differential/difference equations,etc)
- Properties and applications of DFT
- Properties and applications of CFT
- Definition/Properties of Laplace Transform
- Application of Laplace Transform

## **Textbooks:**

Haykin, S. S.Van Veen,B.: Signals and Systems (eTextbook) 2nd edition John-Wiley and Sons (2004)  
ISBN-13: 9781119496212

Haykin, S. S.Van Veen,B.: Signals and Systems (eTextbook) 2nd edition John-Wiley and Sons (2004)  
ISBN-13: 9781119496212-AA

**Learning Outcome:**

- Sketch the signal waveforms and system responses.
- Describe the signals and systems using appropriate mathematical expressions.
- Calculate the Fourier series, Fourier transform, inverse Fourier transform, Laplace transform and inverse Laplace transform.
- Discuss the characteristics and properties of signals and systems.
- Solve differential equations for modeling and analyzing systems.
- Determine the system responses and characteristics.
- Analyze the basic properties of signals and LTI systems.
- Design LTI systems and signals using the basic signal functions and properties.

**Assessment Strategies:**

<b>Continuous Assessment Component</b>	<b>Weightage (%)</b>
CLASS TEST	8
CLASS TEST	8
LAB TEST	8
PRE-CLASS QUIZ	2
PRE-CLASS QUIZ	2
PRE-CLASS QUIZ	2
<b>Sub-Total</b>	<b>30</b>

<b>Examinable Component</b>	<b>Weightage (%)</b>
Written Exam	70
<b>Sub-Total</b>	<b>70</b>

**Weightage Total** **100**