

## Vibrations & Waves and Analog Electronics I

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### Vibrations & Waves:

#### 1. Remembering:

- Define simple harmonic oscillations and identify examples of systems exhibiting this behavior.
- Recall the factors affecting the sharpness of resonance in mechanical and electrical systems.
- Identify the conditions necessary for coupled oscillations to occur.

#### 2. Understanding:

- Explain the concept of linearity in equal frequency differences and its importance in wave phenomena.
- Discuss the concept of perpendicular harmonic waves and analyze their properties.
- Differentiate between plane and spherical waves and their respective characteristics.

#### 3. Applying:

- Calculate the velocity of transverse vibrations in stretched strings using appropriate equations.
- Apply static and dynamic resistance concepts to analyze the behavior of electrical circuits.

#### 4. Analyzing:

- Analyze the behavior of bipolar junction transistors in various configurations.
- Evaluate biasing and stabilization techniques for transistors.

#### 5. Evaluating:

- Critically compare open-loop and closed-loop gain in amplifier circuits.
- Assess the frequency response and common-mode rejection ratio (CMRR) of amplifier circuits.

#### 6. Creating:

- Design experiments to investigate the behavior of systems exhibiting simple harmonic oscillations and resonance.
- Develop circuit designs for amplifiers with desired gain and frequency response characteristics.

By the end of this course, students will be able to demonstrate a deep understanding of the principles of vibrations, waves, and analog electronics, and apply this knowledge to analyze and design systems with complex oscillatory behavior and electronic circuits.

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