# Preparatory Math Topics for Power Engineering

## Course Outline with Outcomes

## Chapter 1 SI Units

### Learning Outcome

Perform simple calculations involving SI units.

### Learning Objectives

1. Describe basic SI units, matching associated symbols for unit prefixes.
2. Perform unit analysis in simple problems.
3. List derived SI units and their associated symbols.
4. Perform conversions both within and between SI and Imperial units.

## Chapter 2 Basic Arithmetic Operations

### Learning Outcome

Perform basic arithmetic operations without the use of a calculator.

### Learning Objectives

1. Add and subtract integers.
2. Multiply and divide whole and decimal numbers.
3. Perform arithmetic operations involving combinations of addition, subtraction, multiplication, division, and powers in the proper order of operation.

## Chapter 3 Fractions, Decimals, and Percentages

### Learning Outcome

Perform basic arithmetic operations involving fractions, decimals, and percentages.

### Learning Objectives

1. Identify proper and improper fractions and mixed numbers.
2. Add, subtract, and multiply fractions, and reduce them to lowest terms.
3. Convert fractions to decimal numbers and decimal numbers to fractions.
4. Analyze percentage problems.

## Chapter 4 Ratio and Proportion

### Learning Outcome

Describe the concepts of ratio and proportion.

### Learning Objectives

1. Convert ratios of one quantity to another quantity.
2. Solve word problems involving ratios and proportions.

## Chapter 5 Equations and Transposition

### Learning Outcome

Transpose equations in order to find values for different variables in a formula.

### Learning Objectives

1. Solve equations and word problems.

## Chapter 6 Lengths, Lines, and Simple Plane Figures

### Learning Outcome

Describe measurement of length, types of lines and angles, and calculate perimeters and areas of simple plane figures.

### Learning Objectives

1. Describe linear measurement systems and convert measurement units from one system to another.
2. Define parallel and perpendicular lines and types of angles.
3. Describe types of simple plane figures, including triangles and quadrilaterals.
4. Describe the components of a circle, circumference, area, and diameter.

## Chapter 7 Areas and Volumes of Solids

### Learning Outcome

Calculate the volumes of rectangular objects, cylinders, and spheres and the surface areas of cylinders and spheres.

### Learning Objectives

1. Convert between commonly used volume units.
2. Calculate the volume of a rectangular prism.
3. Calculate the surface area and volume of a cylinder.
4. Calculate the surface area and volume of a sphere.

### Knowledge Exercises