Table of Contents

Chapter 1 - Loads, Load Paths and Building Codes
1.1 Introduction
1.2 Types of Loads
1.3 Building Codes and Specifications
1.4 Combinations of Load

Chapter 2 - Statics: Principles of Equilibrium
2.1 Introduction
2.2 Types of Equilibrium
2.3 Free Body Diagrams
2.4 Using Equilibrium to Solve for Support Reactions
2.5 Other Applications of Equilibrium in Construction

Chapter 3 - Stress, Strain and Modulus of Elasticity
3.1 Introduction
3.2 Simple Stress
3.3 Allowable Stresses and Design
3.4 Strain
3.5 Modulus of Elasticity, E
3.6 Common Construction Materials

Chapter 4 - Centroids and Moment of Inertia
4.1 Introduction
4.2 Centroid Fundamentals
4.3 Introduction to Moment of Inertia
4.4 Moment of Inertia Fundamentals

Chapter 5 - Beam Behavior, Shear and Bending Moment Diagrams
5.1 Introduction
5.2 Beams in Bending and Bending Stress
5.3 Beams and Shear Stress
5.4 Introduction to Shear and Bending Moment Diagrams
5.5 Shear Force
5.6 Bending Moment
5.7 Beam Deflection

Chapter 6 - Beam Evaluation and Design
6.1 Introduction
6.2 Modes of Bending Failure in Beams
6.3 Rolled Steel Beams Subject to Bending
6.4 Steel Beam Design Philosophy

6.5 Concrete Beams Subject to Bending
6.6 Reinforced Concrete Beam Design Philosophy
6.7 Wood Beam Design
6.8 Shear in Beams

Chapter 7 - Column Evaluation and Design
7.1 Introduction
7.2 Possible Limit States for Columns
7.3 The Axis of Buckling in Columns
7.4 Effective Length
7.5 Steel Column Design Philosophy
7.6 Steel Column Design
7.7 Introduction to Reinforced Concrete Columns
7.8 Types of Reinforced Concrete Columns
7.9 Strength Design Philosophy for Concrete Columns
7.10 Concrete Column Behavior and Interaction Diagrams
7.11 Calculating Design Capacity of a Reinforced Concrete Column
7.12 Introduction to Wood Columns
7.13 Wood Column Behavior
7.14 Wood Column Design

Chapter 8 – Course Capstone
8.1 Introduction
8.2 Capstone Scenario

Appendix A – Structural Steel Tables/Charts
Appendix B – Interaction Diagram
Appendix C – Selected Tables from 2015 NDS Supplement
Answers to Selected Homework