



यशवंतराव चवण महाराष्ट्र ओपन विद्यापीठ  
Yashwantrao Chavan Maharashtra Open University

**B.SC (Hons)(FIRE AND INDUSTRIAL SAFETY)**



**SEMESTER- I**

**FUNDAMENTALS OF FIRE SAFETY**

# Semester -1

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## Fundamentals of Fire Safety

Semester - 1	Course Title
Unit - 1	Basics of Fire
Unit - 2	Chemistry of Fire
Unit - 3	Fire Propagation (Flame Spread and Fire Growth)
Unit - 4	Smoke and Its Effects

## **ENR 1 - Basics of Fire**

### **Structure**

#### **1.0 Objectives**

#### **1.1 Introduction**

#### **1.2 Subject - Interpretation**

- 1.2.1 Fire Origin
- 1.2.2 Principles of Fire
- 1.2.3 Nature and Behaviour of Fire
- 1.2.4 Classification of Fire
- 1.2.5 Principles of Heat Transmission and its Spread in Multi Storey Building
- 1.2.6

#### **1.3 Terminology, Symbols**

#### **1.4 Summary**

## **ENR 2 - Chemistry of Fire**

### **Structure**

#### **1.0 Objectives**

#### **1.1 Introduction**

#### **1.2 Subject - Interpretation**

- 1.2.1 Flash Point
- 1.2.2 Fire Point
- 1.2.3 Ignition Point
- 1.2.4 Spontaneous Combustion
- 1.2.5 Smoking and Sooting Point
- 1.2.6 Flammable Liquids
- 1.2.7 Flammability Range
- 1.2.8 Flash Point Lower (LFL, UFL)
- 1.2.9 Critical Pressure
- 1.2.10 Critical Temperature



## 3.0 Objectives

### 4.1 Introduction

### 4.2 Subject Interpretation

- 4.2.1 Smoke and its Constituents
- 4.2.2 Principles of Specifying Quantity of Smoke
- 4.2.3 Smoke Movement
- 4.2.4 Toxicity of Smoke
- 4.2.5 Effect of Hazardous Agents of Smoke
  - Carbon Monoxide
  - Carbon Dioxide
  - Nitrogen Oxides
  - Sulphur Dioxide
- 4.2.6 Effect of Smoke Inhalation

### 4.3 Terminology, Symbols

### 4.4 Summary

### 4.5 Questions for Practice

- 4.5.1 Write short answers to the following questions.
- 4.5.2 Write short answers to the following questions.
- 4.5.3 Write the answers to the following questions from the topics given below.

### 4.6 Further Work

### 4.7 Reference Books

### 4.8 References for Content



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## B.SC (Hons)(FIRE AND INDUSTRIAL SAFETY)



SEMESTER-I  
FUNDAMENTALS OF INDUSTRIAL SAFETY

# Semester -1

## Fundamentals of Industrial Safety

Semester - 1	Course Title
Unit - 5	Safety Culture
Unit - 6	Industrial Hygiene
Unit - 7	Welfare Facilities
Unit - 8	Behavior-Based Safety (HSE)

## **UNIT 5 - Safety Culture**

### **Structure**

#### **5.0 Objectives**

#### **5.1 Introduction**

#### **5.2 Subject - Interpretation**

- 5.2.1 Introduction to Safety Culture
- 5.2.2 Positive & Negative Safety Culture
- 5.2.3 Benefits of Positive Safety Culture
- 5.2.4 Safety Culture Assessment and Improvement
- 5.3 Terminology, Acronyms
- 5.4 Summary
- 5.5 Questions for Practice
- 5.6 Pathways
- 5.7 Reference Books
- 5.8 References for Content

## **UNIT 6 - Industrial Hygiene**

### **Structure**

#### **6.0 Objectives**

#### **6.1 Introduction**

#### **6.2 Subject - Interpretation**

- 6.2.1 Definition and Importance
- 6.2.2 Measurement of Health & Occupational Safety
- 6.2.3 Introduction to Personal Hygiene
- 6.2.4 The importance of Microbiology
- 6.3 Terminology, Acronyms
- 6.4 Summary
- 6.5 Questions for Practice
- 6.6 Pathways
- 6.7 Reference Books
- 6.8 References for Content

## **UNIT 7 - Water Facilities**

## **Structure**

### **7.0 Objectives**

#### **7.1 Introduction**

#### **7.2 Subject – Interpretation**

- o 7.2.1 Sanitary Concessions
- o 7.2.2 Drinking Water
- o 7.2.3 Changing and Storage Facilities
- o 7.2.4 Rest and Sitting Facilities
- o 7.2.5 Arrangement for Unborn Children
- o 7.2.6 Fire, Air Pollution & Occupational Health Care's (OHC)
- 7.3 Terminology, Terminology
- 7.4 Summary
- 7.5 Questions for Practice
- 7.6 Homework
- 7.7 Reference Books
- 7.8 References for Content

## **UNIT 8 – Behaviour Based Safety (SBS)**

### **Structure**

#### **8.0 Objectives**

#### **8.1 Introduction**

#### **8.2 Subject – Interpretation**

- o 8.2.1 Definition of SBS
- o 8.2.2 Importance of Behavioural Safety at Workplace
- o 8.2.3 Role of Safety Officers in SBS
- o 8.2.4 Factors of Human Behaviour & Safety
- o 8.2.5 Reporting of Behaviour Based Safety Observations
- o 8.2.6 Implementing a SBS in Industries
- o 8.2.7 Role of Supervisors and Safety Officers in Motivation

#### **8.3 Concept of Reward & Recognition**

#### **8.3 Terminology, Terminology**

#### **8.4 Summary**

- 6.3 Conditions for Maximal
- 6.4 Examples
- 6.7 Reference Books
- 6.8 References for Content

# Semester -1

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## Practical - 1

Sr. No	Practical
1	Operation of Dry Chemical Powder Fire Extinguishers
2	Operation of CO <sub>2</sub> Chemical Powder Fire Extinguishers
3	Inspection of Fire Extinguisher
4	Operation of Fire Hydrant System

## Practical - 2

Semester -1	Practical
1	Measurement of Cold Environmental Condition at Work place
2	Measurement of Hot Environmental Condition at Work place
3	Contact Instructors Based Safety Audit
4	Demonstrate the Use of Fire Proximity Suit



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**SEMESTER- II**

**INDUSTRIES AND ERGONOMIC PRACTICES**

# Semester -2

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## Industries and Ergonomic Practices

Semester - 2:	Course Title
Unit - 9	Hazards in Industries
Unit - 10	Introduction to Ergonomics
Unit - 11	Ergonomic Injuries
Unit - 12	Musculoskeletal Injuries

### Unit 9: Hazards in Industry

- Structure
- 9.0 Objectives
  - 9.1 Introduction
  - 9.2 Subject - Importance
  - 9.2.1 Introduction to Hazard
  - 9.2.2 Physical Hazards
  - 9.2.3 Chemical Hazards
  - 9.2.4 Biological Hazards
  - 9.2.5 Environmental Hazards
  - 9.2.6 Organisational Hazards
  - 9.2.7 Mechanical Hazards
  - 9.3 Terminology, Assessment
  - 9.4 Summary
  - 9.5 Questions for Practice
  - 9.6 Feedback
  - 9.7 Reference Books
  - 9.8 References for Content

### Unit 10: Introduction to Ergonomics

- Structure
- 10.0 Objectives
  - 10.1 Introduction
  - 10.2 Subject - Importance
  - 10.2.1 Definition of Ergonomics
  - 10.2.2 Branches of Ergonomics in Industry
  - 10.2.3 Man-Machine Interface (MI)
  - 10.2.4 Effect of Working Posture on Different Parts of the Body
  - 10.2.5 Ergonomics During Setting Up of Computer Workstation
  - 10.3 Terminology, Assessment
  - 10.4 Summary
  - 10.5 Questions for Practice
  - 10.6 Feedback
  - 10.7 Reference Books
  - 10.8 References for Content

### Unit 11: Ergonomic Aspects

- Structure
- 11.0 Objectives
  - 11.1 Introduction
  - 11.2 Subject - Importance
  - 11.2.1 Ergonomic Aspects on Selection
  - 11.2.2 Ergonomics Design Aspects
  - 11.2.3 Micro-ergonomics Aspects
  - 11.2.4 Postural Aspects

### 11.2.7 Musculoskeletal Disorders Due to Poor Ergonomic Design

- Muscle Strain
  - Sprain
  - Cramps
  - Tendinitis
  - Bursitis
  - Arthritis
  - Low Back Pain
  - Cervical Spondylosis
  - Carpal Tunnel Syndrome
  - Thoracic Outlet Syndrome
  - Digital Tunnel Syndrome
- 11.3 Terminology, Vocabulary
- 11.4 Summary
- 11.5 Questions for Review
- 11.6 Feedback
- 11.7 Reference Books
- 11.8 References for Chapter

## Unit 12: Manual Handling Injuries

- 4 - Exercise
- 12.0 Objectives
- 12.1 Introduction
- 12.2 Nature - Interpretation
- 12.3.1 Prevention of Work-Related Musculoskeletal Disorders
- 12.3.2 Personal Training and Postural Adjustment
- 12.4 Terminology, Vocabulary
- 12.5 Summary
- 12.6 Questions for Review
- 12.7 Feedback
- 12.8 Reference Books
- 12.9 References for Chapter



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**SEMESTER- II**

**GENERAL SAFETY IN INDUSTRIES**

# Semester -2

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## General Safety in Industries

Semester -2	Course Title
Unit - 11	Introduction to Workplace Safety
Unit - 14	Permit To Work System
Unit - 15	Non-Respiratory Personal Protective Devices
Unit - 16	Respiratory Personal Protective Devices

### Unit 15: Introduction to Workplace Safety

- Structure
- 15.0 Objectives
  - 15.1 Introduction
  - 15.2 Subject - Importance
  - 15.2.1 Introduction to Hierarchy of Control
  - 15.2.2 Importance & Elements
  - 15.2.3 Hierarchy Safety Pyramid Theory
  - 15.2.4 Introduction to Accident Prevention Strategy
  - 15.3 Terminology, Acronyms
  - 15.4 Summary
  - 15.5 Questions to Review
  - 15.6 Feedback
  - 15.7 Reference Books
  - 15.8 References to Content

### Unit 16: Permit To Work System

- Structure
- 16.0 Objectives
  - 16.1 Introduction
  - 16.2 Subject - Importance
  - 16.2.1 Definition of Work Permit
  - 16.2.2 Importance of PTA
  - 16.2.3 Different Work Permits and Permit Hold
    - Single Work
    - Hot Work
    - Cold Work
    - Confined Space
    - Electrical Isolation
    - Excavation
  - 16.2.4 Responsibilities of Issuer, User, Authorized Manager & Safety Officer in Issuing of Work Permit
  - 16.2.5 Lockout Tagout (LOTO) System
  - 16.3 Terminology, Acronyms
  - 16.4 Summary
  - 16.5 Questions to Review
  - 16.6 Feedback
  - 16.7 Reference Books
  - 16.8 References to Content

### Unit 17: New Regulatory Personal Protective Devices

- Structure
- 17.0 Objectives
  - 17.1 Introduction
  - 17.2 Subject - Importance
  - 17.2.1 Introduction

- 21.2.2 Different Types of the Respiratory Personal Protective Equipment
  - Hood Protection
  - Ear Protection
  - Goggles and Eye Protection
  - Gas Protection
  - Sooty Protection
- 21.2.3 Requirements of PPE to meet Safety Laws
- 21.3 Terminology, Symbols
- 21.4 Summary
- 21.5 Questions for Practice
- 21.6 Feedback
- 21.7 Reference Books
- 21.8 References for Content

## **Unit 10: Respiratory Personal Protective Devices**

- o **Objectives**
- 10.1 Objectives
- 10.2 Introduction
- 10.3 Subject – Importance
- 10.3.1 Introduction
- 10.3.2 Types and Applications in Industrial Use
- 10.3.3 Selection of Respirators
- 10.3.4 Installation in Use of Breathing Apparatus
- 10.3.5 Choosing the Use, Care & Maintenance of Breathing Apparatus
- 10.4 Terminology, Symbols
- 10.4 Summary
- 10.5 Questions for Practice
- 10.6 Feedback
- 10.7 Reference Books
- 10.8 References for Content



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**SEMESTER- II  
SAFETY LEADERSHIP**

# Semester -2

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## Safety Leadership

Semester - 2	Course Title
Unit - 17	Managing Safety
Unit - 18	Management's Safety Responsibilities
Unit - 19	Safety Education
Unit - 20	Safety Officer & Committee

## **Unit 17: Managing Safety**

### **Structure**

- 17.0 Objectives
- 17.1 Introduction
- 17.2 Subject - Interpretation
- 17.2.1 Routes to Manage Safety
- 17.2.2 Role of Individuals in Influencing Managing Safety
- 17.2.3 Positive Health and Safety Practice
- 17.2.4 Characteristics of an Effective Safety Leader
- 17.3 Terminology - Worksheet
- 17.4 Summary
- 17.5 Questions for Practice
- 17.6 Feedback
- 17.7 Reference Books
- 17.8 Reference for Content

## **Unit 18: Management's Safety Responsibilities**

### **Structure**

- 18.0 Objectives
- 18.1 Introduction
- 18.2 Subject - Interpretation
- 18.2.1 Role of Management in Industrial Safety
- 18.2.2 Signifying for Safety
- 18.2.3 Communication and Engagement in Safety
- 18.2.4 Measuring and Improving Safety Leadership Performance
- 18.3 Terminology - Worksheet
- 18.4 Summary
- 18.5 Questions for Practice
- 18.6 Feedback
- 18.7 Reference Books
- 18.8 Reference for Content

## **Unit 19: Safety Education**

### **Structure**

- 19.0 Objectives
- 19.1 Introduction

- 25.1 Subject - Interpretation
- 25.2 Design and Development of Training Programs
- 25.2.1 Training Methods and Strategies
- 25.2.2 Training of Managers, Supervisors, and Workers
- 25.2.3 Evaluation and Review of Training Programs for Effectiveness
- 25.2.4 On-the-Job and Formal Training
- 25.3 Terminology, Semantics
- 25.4 Summary
- 25.5 Questions for Practice
- 25.6 Workbook
- 25.7 Reference Study
- 25.8 References for Content

## **Unit 26: Safety Officer & Committee**

### **Structure**

- 26.0 Objectives
- 26.1 Introduction
- 26.2 Subject - Interpretation
- 26.2.1 Qualification, Roles, and Responsibilities of a Safety Officer
- 26.2.2 Composition, Powers, Functions, and Status of the Safety Committee
- 26.3 Terminology, Semantics
- 26.4 Summary
- 26.5 Questions for Practice
- 26.6 Workbook
- 26.7 Reference Study
- 26.8 References for Content

# Semester -2

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## Practical - 3

Sr. No	Practical
1	Identify the size of particulates in workplace
2	Measurement of Noise level from various sources
3	Measurement of Frequency of Noise
4	Assessment of Height work and issue the Height work permit

## Practical - 4

Sr. No	Practical
1	Measurement of whole-body vibration from acceleration
2	Identification of source of vibration
3	Conduct PPE Audit
4	Preparation of a safety Inspectors Check list for 50 in Industries



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**SEMESTER- III  
INDUSTRIAL HEALTH**

# Semester -3

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## Industrial Health

Semester - 3	Course Title
Unit - 21	Occupational Health
Unit - 22	Health Effects in Industry
Unit - 23	Health Effects from Radiation
Unit - 24	Work-Life Balance

## **Unit 11: Occupational Health**

### **Structure**

- 11.0 Objectives
- 11.1 Introduction
- 11.2 Subject - Interpretation
- 11.2.1 etymology of Occupational Health Care
- 11.2.2 Pre-employment and Post-employment Medical Examinations
- 11.3 Terminology - Acronyms
- 11.4 Summary
- 11.5 Questions for Practice
- 11.6 Homework
- 11.7 References Books
- 11.8 References for Content

## **Unit 12: Health Effects in Industries**

### **Structure**

- 12.0 Objectives
- 12.1 Introduction
- 12.2 Subject - Interpretation
- 12.2.1 Health Effects from Physical Hazards
  - Noise
  - Vibration
  - Cold
  - Hot Stress
  - Ionising Radiation
- 12.3 Terminology - Acronyms
- 12.4 Summary
- 12.5 Questions for Practice
- 12.6 Homework
- 12.7 References Books
- 12.8 References for Content

## **Unit 13: Health Effects from Radiation**

### **Structure**

- 13.0 Objectives
- 13.1 Introduction

- 21.1 Subject - Interpretation
- 21.2 Thermal Radiation
- 21.2.2 Permissible Threshold Exposure Limits
- 21.2.3 Short-Term and Long-Term Effects of Exposure
- 21.2.4 Assessment Control Measures
- 21.3 Terminology, Symbols
- 21.4 Summary
- 21.5 Questions for Practice
- 21.6 Workbook
- 21.7 Reference Books
- 21.8 Reference for Contact

## **Unit 20: Work/Air Release**

### **Structure**

- 20.0 Objectives
- 20.1 Introduction
- 20.2 Subject - Interpretation
- 20.2.1 Psychological Disorders
- 20.2.2 Depression, Anxiety, and Post-Traumatic Stress Disorder
- 20.2.3 Other Types of Emotional Issues
- 20.2.4 Managing Work Stress or Anxiety
- 20.2.5 Emotional & Cognitive Response to Work
- 20.3 Terminology, Symbols
- 20.4 Summary
- 20.5 Questions for Practice
- 20.6 Workbook
- 20.7 Reference Books
- 20.8 Reference for Contact



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**SEMESTER- III  
ENVIRONMENTAL MANAGEMENT**

# Semester -3

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## Environmental Management

Semester - 3	Course Title
Unit - 25	Environmental Chemistry
Unit - 26	Environmental Pollution
Unit - 27	Climate Change
Unit - 28	Environmental Sustainability

## **Unit 25: Environmental Chemistry**

### **Structure**

- 25.0 Objectives
  - 25.1 Introduction
  - 25.2 Subject - Interpretation
    - 25.2.1 Salinities of Sea water
    - 25.2.2 States of Inorganic and Toxicity of Environment
    - 25.2.3 States of Atmosphere
    - 25.2.4 States of Ozone
    - 25.2.5 States of Hydrophere
    - 25.2.6 States of Biosphere
  - 25.3 Terminology, Symbols
  - 25.4 Summary
  - 25.5 Questions for Practice
  - 25.6 Homework
  - 25.7 Reference Books
  - 25.8 Follow-up for Contact
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## **Unit 26: Environmental Pollution**

### **Structure**

- 26.0 Objectives
- 26.1 Introduction
- 26.2 Subject - Interpretation
  - 26.2.1 Water Pollution
  - 26.2.2 Air Pollution
  - 26.2.3 Noise Pollution
  - 26.2.4 Soil Pollution
  - 26.2.5 Radiation and Thermal Pollution
- 26.3 Global Warming
- 26.4 Greenhouse Effect and Greenhouse Effect
- 26.5 Ozone Depletion
  - 26.5.1 Acid Rain
  - 26.5.2 Acid Rain
- 26.6 Terminology, Symbols
- 26.7 Summary
- 26.8 Questions for Practice
- 26.9 Homework
- 26.10 Reference Books
- 26.11 Follow-up for Contact

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## **Unit 27: Climate Change**

### **Structure**

- 27.0 Objectives
- 27.1 Introduction
- 27.2 Subject - Introduction
- 27.2.1 Introduction to Climate Change
- 27.2.2 United Nations Conference on Sustainable Development (UNCED)
- 27.2.3 The Montreal and Kyoto Protocol & the Paris Agreement
- 27.2.4 United Nations Framework Convention on Climate Change (UNFCCC)
- 27.2.5 Sustainable Development
- 27.2.6 Kyoto Protocol
- 27.2.7 Paris Agreement
- 27.3 Terminology, Semantics
- 27.4 Summary
- 27.5 Questions for Revision
- 27.6 Workbook
- 27.7 Reference Books
- 27.8 Reference on the Internet

## **Unit 28: Environmental Sustainability**

### **Structure**

- 28.0 Objectives
- 28.1 Introduction
- 28.2 Subject - Introduction
- 28.2.1 What is Environmental Sustainability?
- 28.2.2 Economic of EWS
- 28.2.3 Resource Management
- 28.2.4 CO<sub>2</sub> Taxation and Environmental Justice
- 28.3 Terminology, Semantics
- 28.4 Summary
- 28.5 Questions for Revision
- 28.6 Workbook
- 28.7 Reference Books
- 28.8 Reference on the Internet



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**SEMESTER- III  
INDUSTRIAL PROCESS SAFETY**

# Semester -3

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## Industrial Process Safety

Semester -3	Course Title
Unit - 09	Introduction to Process Safety
Unit - 10	Elements of a Process Safety Management System
Unit - 11	Operation Safety in Chemical Industry
Unit - 12	Gas Detection Systems

## **Unit 20: Introduction to Process Safety**

### **Structure**

- 20.0 Objectives
  - 20.1 Introduction
  - 20.2 Subject - Interpretation
  - 20.2.1 Safety and its importance of Process Safety
  - 20.2.2 Historical Incidents highlighting the Need for Process Safety
  - 20.3 Terminology, Semantics
  - 20.4 Summary
  - 20.5 Questions for Practice
  - 20.6 Workbook
  - 20.7 Reference Books
  - 20.8 References for Content
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## **Unit 20: Elements of a Process Safety Management System**

### **Structure**

- 20.0 Objectives
  - 20.1 Introduction
  - 20.2 Subject - Interpretation
  - 20.2.1 Key elements of a Process Safety Management System
  - 20.2.2 Implementation in industries
  - 20.2.3 Process of MSMS and its Benefits
  - 20.3 Terminology, Semantics
  - 20.4 Summary
  - 20.5 Questions for Practice
  - 20.6 Workbook
  - 20.7 Reference Books
  - 20.8 References for Content
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## **Unit 21: Operation Safety in Chemical Industry**

### **Structure**

- 21.0 Objectives
- 21.1 Introduction
- 21.2 Subject - Interpretation
- 21.2.1 Hazardous Area Classification (HAC)
- 21.2.2 Layers of Protection Analysis (LOPA)
- 21.2.3 Procedures for the Safe and Efficient Operation of Plants

- 11.1.1 Safety Integrity Level (SIL)
  - 11.1 Terminology, Symbols
  - 11.2 Summary
  - 11.3 Questions for Practice
  - 11.4 Workbook
  - 11.7 Reference Books
  - 11.8 References for Contact
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## **Unit 12: The Detection System**

### **Structure**

- 12.0 Objectives
- 12.1 Introduction
- 12.2 Faults / Inter-variables
  - 12.2.1 Safety Policy Procedures in Confined Spaces Including Hazardous Areas
  - 12.2.2 Start-up and Shut-down Procedures
  - 12.2.3 Process Detection Systems
  - 12.2.4 Major Cause of Explosions (VOC) Prevention
- 12.3 Terminology, Symbols
- 12.4 Summary
- 12.5 Questions for Practice
- 12.6 Workbook
- 12.7 Reference Books
- 12.8 References for Contact

# Semester -3

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## Practical - 5

Sl. No	Practical
1	Measurement of light absorbed by different dyes at specified wavelength
2	Assessment of Confined space activity and fill the confined space work permit
3	Measurement of IC engine exhaust gas levels to identify the gases causing the brown haze with laser
4	Demonstration use of LEL, Detector



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SEMESTER-IV  
FIRE AND SAFETY STRATEGIES  
FOR VARIOUS INDUSTRIES

# Semester -4

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## Fire and Safety Strategies for Various Industries

Semester -4	Course Title
Unit - 11	Hazards in Mining
Unit - 24	Safety in Food Industries
Unit - 25	Safety in Textile Industry
Unit - 26	Safety in Thermal Power Plant

## Unit 14: Minerals in Mining

### Structure

#### 14.0 Objectives

#### 14.1 Introduction

#### 14.2 Subject – Interpretation

#### 14.2.1 Introduction to Mining Safety Management

#### 14.2.2 Mining Underground: Metalliferous and Ferrous

#### 14.2.3 Explosives – for Underground Coal & Metal Mining

#### 14.2.4 Blasting Practice in Mines

#### 14.2.5 Mines: Minerals Storage and Handling

#### 14.2.6 Mining: Rail and Hoist

#### 14.2.7 Mine: Environment

#### 14.2.8 Transportation in Mines

#### 14.2.9 Rock Mechanics, Stress Control and Ground Movements

#### 14.2.10 Mines: Disease

#### 14.2.11 Mining Electrical Safety

#### 14.3 Terminology, Summary

#### 14.4 Summary

#### 14.5 Questions for Practice

#### 14.6 Follow-up

#### 14.7 Reference Books

#### 14.8 References for Content

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## Unit 14: Safety in Food Industries

### Structure

#### 14.0 Objectives

#### 14.1 Introduction

#### 14.2 Subject – Interpretation

#### 14.2.1 Food Safety Assessment

#### 14.2.2 Food Safety Management Procedures

#### 14.2.3 Principles of Safe Food Storage

#### 14.2.4 System of Food Safety

#### 14.2.5 Evaluating HACCP Procedures

#### 14.2.6 Workplace and Personal Hygiene and Product Safety

#### 14.3 Terminology, Summary

#### 14.4 Summary

#### 14.5 Questions for Practice

#### 14.6 Follow-up

**01.7 Reference Books**

**01.8 References for Content**

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**Unit 09: Safety in Textile Industry**

**Structure**

**09.0 Objectives**

**09.1 Introduction**

**09.2 Subject – Interpretation**

**09.2.1 Types of Textile Industry**

**09.2.2 Need of Safety in Textile Industry**

**09.2.3 Textile Process Hazards**

**09.2.4 Health Hazards in Textile Industry and Precautionary Measures**

**09.2.5 Health and Welfare Provisions in Textile Industry**

**09.3 Terminology, Semantics**

**09.4 Summary**

**09.5 Questions for Practice**

**09.6 Fieldwork**

**09.7 Reference Books**

**09.8 References for Content**

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**Unit 10: Safety in Thermal Power Plant**

**Structure**

**10.0 Objectives**

**10.1 Introduction**

**10.2 Subject – Interpretation**

**10.2.1 Introduction to Thermal Power Plants & Furnace Oil Handling System**

**10.2.2 Boiler Operation**

**10.2.3 Steam and Feed Water Cycle**

**10.2.4 Coal Handling & Ash Handling System**

**10.2.5 Safety (Statutory Provisions)**

**10.3 Terminology, Semantics**

**10.4 Summary**

**10.5 Questions for Practice**

**10.6 Fieldwork**

**10.7 Reference Books**

**10.8 References for Content**



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**SEMESTER-IV**  
**INDUSTRIAL WASTE MANAGEMENT**

# Semester -4

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## Industrial Waste Management

Semester -4	Course Title
Unit - 17	Solid Waste Management
Unit - 18	Hazardous Waste Management
Unit - 19	Disposal Techniques of Hazardous Waste
Unit - 41	Radioactive Waste Management

## Unit 17: Solid Waste Management

### Structure

#### 17.0 Objectives

#### 17.1 Introduction

#### 17.2 Subject - Introductory

#### 17.2.1 Classification and Management of Solid Waste

- Food Waste

- Dry leaves Waste

- Paper Waste

- Glass

- Scrap Metal

- Domestic Waste

- E-Waste

- Radioactive Waste

- Plastic Waste

- Battery Waste

#### 17.2.2 Concept of Utilization of Biodegradable Waste

#### 17.3 Terminology, Semantics

#### 17.4 Summary

#### 17.5 Questions for Practice

#### 17.6 Fieldwork

#### 17.7 Reference Books

#### 17.8 Reference for Content

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## Unit 18: Hazardous Waste Management

### Structure

#### 18.0 Objectives

#### 18.1 Introduction

#### 18.2 Subject - Introductory

#### 18.2.1 Characteristics of Hazardous Waste

#### 18.2.2 Generation, Collection, and Handling Methods

#### 18.2.3 Storage and Transportation of Hazardous Waste

#### 18.2.4 Various Categories of Hazardous Waste

#### 18.3 Terminology, Semantics

#### 18.4 Summary

#### 18.5 Questions for Practice

#### 18.6 Fieldwork

## 08.7 Reference Books

### 08.8 References for Content

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#### Unit 09: Hazardous Technologies of Hazardous Waste

##### Structure

###### 09.0 Objectives

###### 09.1 Introduction

###### 09.2 Subject – Introduction

###### 09.3.1 Disposal Techniques

###### • Landfill

###### • Landfill

###### • Co-Processing

###### • Recovery

###### 09.3.2 Safety Measures for Handling Hazardous Waste

###### 09.3.3 Health Risks Associated with Hazardous Waste

###### 09.3.4 Environmental Challenges of Hazardous Waste

###### 09.3.5 Pollution Control Board (PCB) Guidelines

###### 09.4 Terminology, Semantics

###### 09.5 Summary

###### 09.6 Questions for Practice

###### 09.7 Follow-up

## 09.1 Reference Books

### 09.2 References for Content

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#### Unit 10: Radioactive Waste Management

##### Structure

###### 10.0 Objectives

###### 10.1 Introduction

###### 10.2 Subject – Introduction

###### 10.2.1 Overview of Radioactive Waste

###### 10.2.2 Sources and Types of Radioactive Waste

###### 10.2.3 Methods of Radioactive Waste Disposal

###### 10.2.4 Environmental and Health Effects of Radioactive Waste

###### 10.2.5 Safety Measures in Handling and Storage

###### 10.3 Terminology, Semantics

###### 10.4 Summary

###### 10.5 Questions for Practice

02.4. **References**

02.7. **References for Content**

02.8. **References for Content**



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**SEMESTER- IV  
SAFETY IN CONSTRUCTION INDUSTRIES**

# Semester -4

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## Safety in Construction Industries

Semester - 4	Course Title
Unit - 01	Construction Project Management
Unit - 02	Construction Machinery Safety
Unit - 03	Safety in Special Works
Unit - 04	Construction Safety Management

## **Unit 11: Construction Project Management**

### **Structure**

- 41.0 Objectives
- 41.1 Introduction
  - 41.1.1 Subject – Introduction
  - 41.1.2 Mobilisation of Man and Material
  - 41.1.3 Medical Examination
  - 41.1.4 Documentation of Workers
  - 41.1.5 Construction Safety Manual
  - 41.1.6 Safe Access
  - 41.1.7 Safety of H
  - 41.1.7 Signs and Indicators
  - 41.1.7 Terminology, Abbreviations
- 41.5 Summary
- 41.6 Questions for Practice
- 41.6 Homework
- 41.7 Reference Books
- 41.8 References for Content

## **Unit 12: Construction Machinery Safety**

### **Structure**

- 42.0 Objectives
- 42.1 Introduction
  - 42.1.1 Subject – Introduction
  - 42.1.2 Heavy Lifting Items
  - 42.1.2 Earth Moving Equipment
  - 42.1.3 Bulky Wagon
  - 42.1.4 Motor Trucks
  - 42.1.5 Material Handlers
  - 42.1.6 Cranes
  - 42.1.7 Tower Cranes
  - 42.1.8 Lifting Gears
  - 42.1.9 Hoists & Lifts
  - 42.1.10 Temporary Power Supply
- 42.5 Terminology, Abbreviations
- 42.6 Summary
- 42.6 Questions for Practice
- 42.6 Homework
- 42.7 Reference Books
- 42.8 References for Content

## **Unit 48: Safety in Special Works**

### **Structure**

#### **48.0 Objectives**

#### **48.1 Introduction**

#### **48.2 Subject – Introduction**

#### **48.2.1 High-Rise Buildings**

#### **48.2.2 Bridges and Tunnels**

#### **48.2.3 Roads and Railways**

#### **48.2.4 Asphaltting**

#### **48.2.5 Precast Concrete**

#### **48.2.6 Electrical Installations and Lifts**

#### **48.2.7 Safety in Use and Handling of Explosives in Quarrying & Demolition Operations**

#### **48.3 Terminology, Glossaries**

#### **48.4 Summary**

#### **48.5 Questions for Practice**

#### **48.6 Follow-up**

#### **48.7 Reference Books**

#### **48.8 References for Content**

## **Unit 49: Construction Safety Management**

### **Structure**

#### **49.0 Objectives**

#### **49.1 Introduction**

#### **49.2 Subject – Introduction**

#### **49.2.1 Construction Safety Management – Issues & Challenges**

#### **49.2.2 Daily TBT & Routine Trainings**

#### **49.2.3 PPEs Used in Construction Activities**

#### **49.3 Terminology, Glossaries**

#### **49.4 Summary**

#### **49.5 Questions for Practice**

#### **49.6 Follow-up**

#### **49.7 Reference Books**

#### **49.8 References for Content**



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**SEMESTER- IV  
OCCUPATIONAL DISEASES**

# Semester -4

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## Occupational Diseases

Semester - 4	Course Title
Unit - 01	Introduction to Occupational Diseases
Unit - 02	Notifiable Occupational Diseases
Unit - 03	Occupational Hazards in Radiation Industry
Unit - 04	Occupational Psychology

## **Unit 15 Occupational Diseases**

### **Structure**

- 45.0 Objectives
- 45.1 Introduction
- 45.2 Subject - Interpretation
  - 45.2.1 Safety data and interpretation
  - 45.2.2 Differences Between Occupational Diseases and Non-Occupational Diseases
  - 45.2.3 Role of Safety Officers in Disease Prevention
  - 45.2.4 Causes & Risk Factors of Occupational Diseases
- 45.3 Terminology - Acronyms
- 45.4 Summary
- 45.5 Questions for Practice
- 45.6 Feedback
- 45.7 Reference Books
- 45.8 Reference for Content

## **Unit 16 Non-Fatal Occupational Diseases**

### **Structure**

- 46.0 Objectives
- 46.1 Introduction
- 46.2 Subject - Interpretation
  - 46.2.1 Introduction to Non-Fatal Occupational Diseases
  - 46.2.2 Diseases such as:
    - Silicosis
    - Asbestosis
    - Pneumoconiosis
    - Anthracosis
    - Fluorosis
    - Arteriosclerosis
    - Lead, & Cadmium, Chromium, and Manganese Toxicity
- 46.3 Terminology - Acronyms
- 46.4 Summary
- 46.5 Questions for Practice
- 46.6 Feedback
- 46.7 Reference Books
- 46.8 Reference for Content

## **Unit 07: Occupational Health and Safety Initiatives**

### **Structure**

- 07.0 Objectives
- 07.1 Introduction
- 07.2 Subject - Interpretation
- 07.2.1 Biological Effects of Radiation
- 07.2.2 Interaction of Radiation with Cells
- 07.2.3 Direct and Indirect Interactions
- 07.2.4 Effect of Radiation on Living Cells
- 07.2.5 Chromosomal Aberrations
- 07.2.6 Genetic and Tumour Effects
- 07.2.7 Deterministic and Stochastic (Probabilistic) Effects
- 07.2.8 Effects of Ionising and Whole-body Exposure
- 07.3 Terminology, Semantics
- 07.4 Summary
- 07.5 Questions for Practice
- 07.6 Feedback
- 07.7 Reference Books
- 07.8 Reference for Contact

## **Unit 08: Occupational Psychology**

### **Structure**

- 08.0 Objectives
- 08.1 Introduction
- 08.2 Subject - Interpretation
- 08.2.1 Elements of Industrial Psychology
- 08.2.2 Mental Health in Industry
- 08.2.3 Signs of Adaptation Syndrome
- 08.2.4 Business Adaptation
- 08.2.5 Workability
- 08.2.6 Interest and Satisfaction in Work
- 08.3 Terminology, Semantics
- 08.4 Summary
- 08.5 Questions for Practice
- 08.6 Feedback
- 08.7 Reference Books
- 08.8 Reference for Contact



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**SEMESTER- V**  
**SAFETY IN ELECTRICAL SYSTEMS**

# Semester -5

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## Safety in Electrical Systems

Semester - 5	Course Title
Unit - 01	Electrical Safety
Unit - 02	Electrical Hazards and Accidents
Unit - 03	Protection Systems and Prevention of Shocks
Unit - 04	Electrical Overload and Protection

## **Unit 58: Business Safety**

### **Structure**

- 45.0 Objectives
  - 45.1 Introduction
  - 45.2 Subject - Interpretation
  - 45.2.1 Basic Electricity
  - 45.2.2 Electrical Safety from American Portable Appliances
  - 45.2.3 Control Measures
  - 45.2.4 Use of Personal Equipment
  - 45.2.5 Electrical Safety in Home, Generator, Transmission, and Distribution
  - 45.2.6 Lightning Accidents
  - 45.2.7 Circuits for Installation and Installation
  - 45.3 Terminology - Summary
  - 45.4 Summary
  - 45.5 Questions for Practice
  - 45.6 Workbook
  - 45.7 Follow-up Study
  - 45.8 Follow-up Assessment
- 

## **Unit 59: Electrical Safety and Accident**

### **Structure**

- 46.0 Objectives
- 46.1 Introduction
- 46.2 Subject - Interpretation
- 46.2.1 Primary and Secondary Electrical Safety
- 46.2.2 Elements of Electric Shock
- 46.2.3 Probability of Lethal Shock
- 46.2.4 Three-Phase AC System Shock
- 46.2.5 Shock from Backup DC System
- 46.2.6 AC vs. DC System
- 46.2.7 Effects of Electrical Parameters on the Human Body
- 46.2.8 Insulating Effects
- 46.2.9 Contact Effects
- 46.2.10 Severity of Electric Shock
- 46.2.11 Burns, Scalds, Frost Injuries, and Miscellaneous
- 46.2.12 Electrical Causes of Fire and Explosion
- 46.2.13 Lightning Hazards
- 46.3 Terminology - Summary

- 61.2 Summary
  - 61.2 Questions for Practice
  - 61.2 Feedback
  - 61.2 Reference Books
  - 61.2 Reference for Contents
- 

## **Unit 10: Protection Systems and Protection of Shocks**

### **Structure**

- 10.1 Objectives
- 10.1 Introduction
- 10.2 Subject – Interpretation
- 10.2.1 Fault, Circuit Breaker, and Interlocking/locking
- 10.2.2 System Protection
- 10.2.3 Safe Systems from Faults/Errors
- 10.2.4 Safety Measures for Electrical Work
- 10.2.5 Prevention of Shock, Flash Shock, and Burns
- 10.2.6 Protection of Insulators, wires, and Conductors
- 10.2.7 Safety in Use of Portable Power Tools
- 10.2.8 Electrical Guards
- 10.2.9 Personal Protective Equipment
- 10.2.10 Emergency Procedures and Rescue (First Aid and CPR)
- 10.3 Terminology, Acronyms
- 10.3 Summary
- 10.3 Questions for Practice
- 10.3 Feedback
- 10.3 Reference Books
- 10.3 Reference for Contents

## **Unit 11: Machine Overload and Protection**

### **Structure**

- 11.1 Objectives
- 11.1 Introduction
- 11.2 Subject – Interpretation
- 11.2.1 Overload and Short Circuit Protection
- 11.2.2 No Load Protection
- 11.2.3 earth fault protection
- 11.2.4 Protection and Continuity Test

## 6.1.1.5 Field Measurements

### 6.1.1.5.1 Poly-Resistant Isolates (PRL) System

#### 6.1.1.5.1.1 Earth Leakage Circuit Breaker (ELCB)

##### 6.1.1.5.1.1.1 Earthing System and Earthing Standards

##### 6.1.1.5.1.1.2 Earthing Performance

##### 6.1.1.5.1.1.3 Immunity Against Surges and Voltage Fluctuations

##### 6.1.1.5.1.1.4 Technology, Norms

##### 6.1.1.5.1.1.5 Summary

##### 6.1.1.5.1.1.6 Quantities to Monitor

##### 6.1.1.5.1.1.7 Authors

##### 6.1.1.5.1.1.8 Reference Books

##### 6.1.1.5.1.1.9 Reference Documents



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SEMESTER-V  
FIRE & SAFETY LEGAL COMPLIANCE

# Semester -5

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## Fire & Safety Legal Compliance

Semester - 5	Course Title
Unit - 33	History of Safety
Unit - 34	Factories Act 1948
Unit - 35	Labour Welfare Acts and Rules
Unit - 36	Other Safety Legislations

## Unit 10: History of Safety

### Structure

- 10.0 Objectives
  - 10.1 Introduction
  - 10.2 Subject - Interpretation
  - 10.2.1 ISO Career and Development, including Safety, Health, and Welfare of Workers
  - 10.2.2 OSHA (Occupational Safety and Health Administration) (Department)
  - 10.2.3 NIOSH (Safety, Health, and Environmental) Policy
  - 10.2.4 International Organizations
  - 10.2.5 Trade Policy Affecting SHE
  - 10.3 Terminology - Summary
  - 10.4 Summary
  - 10.5 Questions for Practice
  - 10.6 Workbook
  - 10.7 Reference Books
  - 10.8 Reference Case for Content
- 

## Unit 11: Practices for SHE

### Structure

- 11.0 Objectives
  - 11.1 Introduction
  - 11.2 Subject - Interpretation
  - 11.2.1 Overview of the Factor on SHE 2000
  - 11.2.2 Processes under the Act and Rules/MAR Terms, also with Amendments
  - 11.2.3 Examples under the Act/para Act
  - 11.3 Terminology - Summary
  - 11.4 Summary
  - 11.5 Questions for Practice
  - 11.6 Workbook
  - 11.7 Reference Books
  - 11.8 Reference Case for Content
- 

## Unit 12: Labour Welfare Acts and Rules

### Structure

64.0 Objectives
64.1 Introduction
64.2 Subject - Interpretation
64.2.1 Employment Data Insurance Act 1946
64.2.2 Workmen's Compensation Act 1948
64.2.3 OMS Labour and Women Employees Act
64.3 Terminology - Definitions
64.4 Summary
64.5 Questions for Practice
64.6 Workbook
64.7 Reference Books
64.8 References for Content

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## **Unit 65: Other Safety Legislations**

### **Structure**

65.0 Objectives
65.1 Introduction
65.2 Subject - Interpretation
65.2.1 In case Workers Act 1902 with Child Regulations 1902
65.2.2 Mines Act
65.2.3 In case Employees Act 1948 and Rules
65.2.4 Motorwork Act and Rules
65.2.5 Gas Cylinders Rules
65.2.6 Radiation Protection Rules 2009
65.3 Terminology - Definitions
65.4 Summary
65.5 Questions for Practice
65.6 Workbook
65.7 Reference Books
65.8 References for Content



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**SEMESTER - V**

**SAFETY AUDIT AND MANAGEMENT SYSTEM**

# Semester -5

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## Safety Audit and Management System

Semester - 5	Course Title
Unit - 01	Codes on Safety
Unit - 02	International Labour Organizations
Unit - 03	Introduction to ISO
Unit - 04	ISO 45001:2018 Audit

## **Unit 17: Safety and Safety**

### **Structure**

- 17.0 Objectives
  - 17.1 Introduction
  - 17.2 Subject - Interpretation
    - 17.2.1 Safety Provisions in Occupational Safety and Health Administration (OSHA)
    - 17.2.2 Introduction to Various OSHA Standards of Safety and Health
  - 17.3 Terminology, Acronyms
  - 17.4 Summary
  - 17.5 Questions for Practice
  - 17.6 Workbook
  - 17.7 Reference Books
  - 17.8 Reference for Career
- 

## **Unit 18: International Labour Organization**

### **Structure**

- 18.0 Objectives
  - 18.1 Introduction
  - 18.2 Subject - Interpretation
    - 18.2.1 History and Evolution of the ILO
    - 18.2.2 Conventions and Recommendations of Fundamental
    - 18.2.3 Key ILO Conventions (Convention 87, 102, 133)
  - 18.3 Terminology, Acronyms
  - 18.4 Summary
  - 18.5 Questions for Practice
  - 18.6 Workbook
  - 18.7 Reference Books
  - 18.8 Reference for Career
- 

## **Unit 19: Introduction to ILO**

### **Structure**

- 19.0 Objectives
- 19.1 Introduction
- 19.2 Subject - Interpretation
  - 19.2.1 History and Evolution of the ILO's Role
  - 19.2.2 Benefits of ILO Implementation

60.2.1 CRM Management System Requirements
60.2.2 Objectives of a Sales and Marketing Management System
60.2.3 Terminology, Semantics
60.2.4 Summary
60.2.5 Questions for Practice
60.2.6 Workbook
60.2.7 Reference Books
60.2.8 References for Current

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#### **Unit 60: ISO 45001:2018 Audit**

##### **Structure**

60.1 Objectives
60.1.1 Introduction
60.2 Subject - Interpretation
60.2.1 Audit Process – Audit Method, Audit Plan
60.2.2 Audit Working Document (Checklist) and Sampling Plans for Auditing
60.2.3 CRM Management System Model
60.2.4 CRM Objectives and Planning
60.2.5 Legal and Other Requirements
60.2.6 ISO 45001:2018 Requirements
60.2.7 Terminology, Semantics
60.2.8 Summary
60.2.9 Questions for Practice
60.2.10 Workbook
60.2.11 Reference Books
60.2.12 References for Current



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**SEMESTER- V**  
**INDUSTRIAL FIRE PROTECTION**

# Semester -5

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## Industrial Fire Protection

Semester - 5	Course Title
Unit - 01	Codes on Safety
Unit - 02	International Labour Organization
Unit - 03	Introduction to ISO
Unit - 04	ISO 47001:2018 Audit

## **Unit 80: Introduction to Fire Protection Systems**

### **Structure**

- 80.0 Objectives
  - 80.1 Introduction
  - 80.2 Subject - Interpretation
  - 80.3 Importance of Fire Protection Systems
  - 80.3.1 Classification of Fire Protection Systems and Their Sectors
  - 80.3.2 Fire Triangle: Understanding Fire and Combustion
  - 80.3.3 Fire Hazards in Submarine and Industries
  - 80.3.4 Overview of Fire Safety Regulations and Standards
  - 80.4 Terminology, Acronyms
  - 80.5 Summary
  - 80.6 Questions for Practice
  - 80.6 Homework
  - 80.7 Reference Books
  - 80.8 Software for the Content
- 

## **Unit 81: Passive Fire Protection Systems**

### **Structure**

- 81.0 Objectives
  - 81.1 Introduction
  - 81.2 Subject - Interpretation
  - 81.2.1 Introduction to Passive Fire Protection
  - 81.2.2 Fire Protection of Buildings and Means of Escape
  - 81.2.3 Design Considerations for Fire Risks
  - 81.2.4 Fireproofing Methods and Sprays
  - 81.2.5 Fireproof Doors, Types and Features
  - 81.2.6 Fire Walls: Purpose and Construction
  - 81.2.7 Protection of Cable Wires Against Fire
  - 81.2.8 Fireproofing Materials: Types and Applications
  - 81.3 Terminology, Acronyms
  - 81.4 Summary
  - 81.5 Questions for Practice
  - 81.5 Homework
  - 81.6 Reference Books
  - 81.6 Software for the Content
-

## **Unit 40: Active Fire Protection Systems**

### **Structure**

#### **40.0 Objectives**

##### **40.1 Introduction**

##### **40.2 Subject - Interpretation**

##### **40.2.1 Fire Hydrant System: Components and Functioning**

##### **40.2.2 Automatic Detectors: Working Principles and Applications**

##### **40.2.3 Infra-red Flame Detectors: Design for Fire Safety**

##### **40.2.4 Thermal Detectors: Operation and Efficiency**

##### **40.2.5 Smoke Detectors: Types and Sensitivity Level**

##### **40.2.6 Air Sampling Detectors: Early Fire Detection Mechanism**

##### **40.2.7 Automatic Sprinkler Systems: Types and Activation Principle**

#### **40.3 Forming up: Scenario**

#### **40.4 Summary**

#### **40.5 Questions for Practice**

#### **40.6 Feedback**

#### **40.7 Follow-up Study**

#### **40.8 Follow-up for Contact**

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## **Unit 41: Fire Extinguishment and Emergency Response**

### **Structure**

#### **41.0 Objectives**

##### **41.1 Introduction**

##### **41.2 Subject - Interpretation**

##### **41.2.1 Different Types of Fire Extinguishers and Their Use**

- Water based extinguishers

- Foam Extinguishers

- Dry Chemical Powder Extinguishers

- Carbon Dioxide Extinguishers

- Specialised Extinguishers

##### **41.2.2 Inspection and Maintenance of Portable Fire Extinguishers**

##### **41.2.3 Factors on Fire Extinguishing: Methods and Compliance**

##### **41.2.4 Role of Fire Brigades in Natural Fire Emergencies**

##### **41.2.5 Firefighting Techniques and Equipment**

##### **41.2.6 Rescue Operations and Safety Precautions**

##### **41.2.7 Coordination with Emergency Response Teams**

#### **41.3 Forming up: Scenario**

#### **41.4 Summary**

#### **41.5 Questions for Practice**

64.1. The Month

64.2. The Name of the Month

64.3. The Name of the Day

# Semester-5

## Practical - 6

Sr. No	Practical
1	Measurement of Light Intensity using lux meter
2	Develop the Standard (Safe) Operating Procedure (SOP) of related to handling of any equipment.
3	Prepare the Scaffolding inspection to per checklist
4	Prepare a MSDS on any of the two chemicals



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SEMESTER- VI

MANUFACTURING SAFETY PRACTICES

# Semester -6

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## Manufacturing Safety Practices

Semester - 6	Course Title
Unit - 05	Machinery Safety
Unit - 06	Illumination & Noise
Unit - 07	Ventilation & Heat Control
Unit - 08	Material Handling

## **Unit 40: Machinery Safety**

### **Structure**

- 40.0 Objectives
  - 40.1 Introduction
  - 40.2 Subject - Interpretation
    - 40.2.1 The Labelling of Machinery
    - 40.2.2 Machinery Design & Controls
    - 40.2.3 Non-Mechanical Hazards
    - 40.2.4 Selection of Guards
      - 40.2.4.1 Types of Guards: Interlocks & Discharge
  - 40.3 Terminology - Semantics
  - 40.4 Summary
  - 40.5 Questions for Practice
  - 40.6 Feedback
  - 40.7 Reference Books
  - 40.8 Reference for Current
- 

## **Unit 41: Illumination & Noise**

### **Structure**

- 41.0 Objectives
  - 41.1 Introduction
  - 41.2 Subject - Interpretation
    - 41.2.1 Safe Area of Illumination
    - 41.2.2 Safety Requirements of Illumination
    - 41.2.3 ILO & Various Institutes Guidelines for Illumination
    - 41.2.4 Measurement and Safety Assessment of Illumination
    - 41.2.5 Health Effects from High Illumination & Control Panel (and) Illumination
  - 41.3 Terminology - Semantics
  - 41.4 Summary
  - 41.5 Questions for Practice
  - 41.6 Feedback
  - 41.7 Reference Books
  - 41.8 Reference for Current
- 

## **Unit 42: Ventilation & Heat Control**

### **Structure**

61.0 Objectives
61.1 Introduction
61.2 Subject - Interpretation
61.2.1 Purpose of Ventilation
61.2.2 Thermal Environment and its Measurement
61.2.3 Physiology of Heat Regulation
61.2.4 Modes of Heat Stress
61.2.5 Control of Heat Exchange
61.2.6 Control of Sweat
61.2.7 Indices and their related parameters
61.2.8 Control of Relative Humidity
61.2.9 Evaporative Cooling
61.2.10 HVAC Systems in Industrial Safety
61.3 Terminology, acronyms
61.4 Summary
61.5 Questions for Practice
61.6 Feedback
61.7 Reference Books
61.8 Reference for Content

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## **Unit 62: Manual Handling**

### **Structure**

62.0 Objectives
62.1 Introduction
62.2 Subject - Interpretation
62.2.1 Ergonomics and Manual Handling
62.2.2 Assessment of Job for Handling
62.2.3 Characteristics Posture for Lifting
62.2.4 Weight Lifting Guidelines
62.3 Terminology, acronyms
62.4 Summary
62.5 Questions for Practice
62.6 Feedback
62.7 Reference Books
62.8 Reference for Content



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**SEMESTER- VI  
ENVIRONMENTAL SAFETY IN INDUSTRIES**

# Semester -6

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## Environmental Safety in Industries

Semester - 6	Course Title
Unit - 69	Waste Water Treatment
Unit - 70	Environmental Monitoring
Unit - 71	Environmental Impact Assessment
Unit - 72	Environmental Legislation

## **Unit 46: Waste Water Treatment**

### **Structure**

46.0 Objectives

46.1 Introduction

46.2 Subject - Interpretation

46.2.1 Different Sources of Wastewater

46.2.2 Operation and Maintenance of Different Wastewater Treatment Plants

- Effluent Treatment Plant (ETP)

- Sewage Treatment Plant (STP)

- Combined Effluent Treatment Plant (CETP)

- Reverse Osmosis (RO) Systems

46.2.3 Introduction to Solid Masses & Sludge (SLS) & Sewerage

46.3 Terminology - Summary

46.4 Summary

46.5 Questions for Practice

46.6 Feedback

46.7 Follow-up Study

46.8 Follow-up Assessment

## **Unit 48: Environmental Monitoring**

### **Structure**

48.0 Objectives

48.1 Introduction

48.2 Subject - Interpretation

48.2.1 Purpose & Benefits of Environmental Monitoring

48.2.2 Water Monitoring

48.2.3 Ambient Air Quality

48.2.4 Air Pollution Monitoring System

48.2.5 Air Pollution Control Devices

48.2.6 Groundwater Quality Monitoring

48.2.7 Noise Monitoring

48.2.8 Soil Monitoring

48.2.9 Discharge Standards of Treated Waste

48.2.10 Reasons of Monitoring

48.2.11 Regulatory Aspects and Legal Obligations

48.3 Terminology - Summary

48.4 Summary

48.5 Questions for Practice

- 10.4 Air Quality
  - 10.7 Reference Books
  - 10.8 References for Content
- 

#### **Unit VI: Environmental Impact Assessment**

##### **Structure**

- VI.0 Objectives
  - VI.1 Introduction
  - VI.2 EIA - Definition
  - VI.2.1 Definition, Objectives, and Purpose of EIA
  - VI.2.2 Types and Stages of EIA
  - VI.2.3 Importance of Public Participation in Environmental Decision-Making
  - VI.2.4 Assessment of Impact (Physical, Social, Economic, Natural, etc.)
  - VI.2.5 Mitigation Measures of EIA
  - VI.2.6 Prediction and Evaluation of Impacts on Air, Water, Noise, and Biological Environment
  - VI.2.7 Mitigation Measures
  - VI.3 Terminology, Schedule
  - VI.4 Summary
  - VI.5 Questions for Practice
  - VI.6 Homework
  - VI.7 Reference Books
  - VI.8 References for Content
- 

#### **Unit VII: Environmental Legislations**

##### **Structure**

- VII.0 Objectives
- VII.1 Introduction
- VII.2 EIA - 1986 Act
- VII.2.1 Water (Prevention & Control of Pollution) Act, 1986
- VII.2.2 Air (Prevention and Control of Pollution) Act, 1986
- VII.2.3 Environment (Protection) Act, 1986
- VII.3 Terminology, Schedule
- VII.4 Summary
- VII.5 Questions for Practice
- VII.6 Homework
- VII.7 Reference Books
- VII.8 References for Content



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**SEMESTER- VI  
CHEMICAL HANDLING SAFETY**

# Semester -6

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## Chemical Handling Safety

Semester - 6	Course Title
Unit - 03	Chemical Hazards
Unit - 04	Chemical Entry to Human System
Unit - 05	Safety in Storage and Handling of Hazardous Chemicals and Gases
Unit - 06	Safety Provisions in Chemical Industry

#### Unit 73: Chemical Hazards

- Introduction to Chemical Hazards
- Dangerous Properties of Chemicals
- Types of Chemical Hazards
  - Dust
  - Gases
  - Fumes
  - Mist
  - Vapours
  - Smoke
  - Aerosols

#### Unit 74: Chemical Entry to Human System

- Routes of Entry to Human System
- Recognition, Evaluation, and Control of Risk Hazards
- Concepts of Dose-Response Relationship
- Biochemical Action of Toxic Substances

#### Unit 75: Safety in Storage and Handling of Flammable Chemicals and Gases

- General Considerations for Storage and Handling of Flammable and Industrial Gases
- Safety During Pipeline Transport
- Safety in Chemical Laboratories

#### Unit 76: Safety Precautions in Chemical Industry

- Safety Precautions
  - Level and Flow Indicators
  - Manways and Traps
  - Protection of Walls, Columns, and Towers from Lightning

#### Colour Coding for Pipes and Cylinders



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**SEMESTER- VI**  
**ADVANCED INDUSTRIAL MANAGEMENT**

# Semester -6

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## Advanced Industrial Management

Semester - 6	Course Title
Unit - 77	Planning for safety
Unit - 78	Industrial Safety Requirements
Unit - 79	Safety Policy
Unit - 80	Work Analysis Method (WAM)

#### **Unit 27 : Planning for safety**

##### **Structure**

- 27.1 Objectives
- 27.2 Introduction
- 27.3 Subject - interpretation
- 27.3.1 Planning
- 27.3.2 effective planning
- 27.3.3 Planning process
- 27.3.4 Range of planning
- 27.3.5 Knowledge, Level 11
- 27.4 Summary
- 27.5 Questions for Practice
- 27.6 Reference Book

#### **Unit 28 : content of Safety Regulations**

##### **Structure**

- 28.1 Objectives
- 28.2 Introduction
- 28.3 Subject - interpretation
- 28.3.1 Safety Regulations
- 28.3.2 European Regulation
- 28.3.3 Aspects of safety Planning
- 28.3.4 Knowledge
- 28.4 Summary
- 28.5 Questions for Practice
- 28.6 Reference Book

#### **Unit 29 : Safety Policy**

##### **Structure**

- 29.1 Objectives
- 29.2 Introduction
- 29.3 Subject - interpretation
- 29.3.1 Safety Organization
- 29.3.2 Goal of Policy
- 29.3.3 Safety Policy
- 29.3.4 Legal Obligations
- 29.3.5 Knowledge
- 29.4 Summary
- 29.5 Questions for Practice
- 29.6 Reference Book

#### **Unit 30 : Major Accident Hazard (MAH)**

##### **Structure**

- 30.1 Objectives
- 30.2 Introduction
- 30.3 Subject - interpretation
- 30.3.1 MAH Activities
- 30.3.2 MAH Process
- 30.3.3 MAHs hazards
- 30.3.4 Questions for Practice

- 82.1 Technology
- 82.2 Services
- 82.3 Questions to Ponder
- 82.4 Homework Study

# Semester-6

## Practical - 7

Sr. No	Practical
1	Conduct Machine Guarding Audit for different machines
2	Preparation of OHS: Emergency plan for a industry
3	Conduct Mock drill
4	Prepare checklist and conduct safety Audit at workplace



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**SEMESTER- VII  
SAFETY RISK ASSESSMENT**

# Semester -7

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## Safety Risk Assessment

Semester -7	Course Title
Unit - 01	Introduction to Risk Assessment
Unit - 02	Hazard Identification Methods
Unit - 03	Assessment Techniques
Unit - 04	Major Accident Hazards (MAH)

## **Unit 01: Introduction to Risk Assessment**

### **Structure**

- 11.0 Introduction
- 11.1 Subject – Introduction
- 11.2 Importance and Objectives of Risk Assessment
- 11.2.1 Types of Risk assessment
- 11.2.2 Definitions
- 11.3 Terminology
- 11.4 Summary
- 11.5 Quantitative practice

## **Unit 02: Hazard Identification Methods**

### **Structure**

- 02.0 Introduction
- 02.1 Subject – Introduction
- 02.2 Subject – Introduction
- 02.2.1 Traditional Hazard Analysis (THA)
- 02.2.2 Hazard identification and Risk Assessment (HRA) with experts
- 02.2.3 Checklists
- 02.3 Terminology
- 02.4 Summary
- 02.5 Quantitative practice

## **Unit 03: Assessment Techniques**

### **Structure**

- 03.0 Introduction
- 03.1 Introduction
- 03.2 Subject – Introduction
- 03.2.1 Failure Mode and Effect Analysis
- 03.2.2 Approximate Probability (APOR) study
- 03.2.3 Audit Trail Analysis (ATA)
- 03.2.4 Event Tree Analysis (ETA)
- 03.2.5 Fault Tree Analysis (FTA)
- 03.3 Terminology
- 03.4 Summary
- 03.5 Quantitative practice

## Unit 54: Major Accident Hazards (MAH)

### Structure

Objectives:

54.0 Introduction

54.1 Subject - introduction

54.2 MAH Major Accident Hazards

54.2.1 Identification and assessment of MAH installation

54.2.2 Rules of Governance, Management

54.2.3 Local Authorities and MAH

54.2.4 Code of Practice for major accident control

54.3 Technology

54.4 Summary

54.5 Questions/Answers



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**SEMESTER- VII  
INCIDENT INVESTIGATION**

# Semester - 7

## Incident Investigation

Semester - 7	Course Title
Unit - 01	Introduction to Incident Investigation
Unit - 02	Theories of Law Causation
Unit - 03	Root cause analysis
Unit - 04	Case studies of accident investigation

## Unit 66: Introduction to Incident Investigation

### Structure

- 01.00 Introduction
- 01.1 Subject Interpretation
- 01.1.1 Process and Methodology of Investigation
- 01.1.2 Legal and Regulatory Requirements
- 01.2 Terminology
- 01.4 Summary
- 01.5 Questions for practice

## Unit 66: Theories of Loss Causation

### Structure

- 01.00 Introduction
- 01.1 Introduction
- 01.2 Subject Interpretation
- 01.2.1 Qualitative and Quantitative Theories
- 01.2.2 Critical Factors
- 01.2.3 Identifying, Labeling and Root Causes
- 01.2.4 Revised Classification of Factors associated with accident
- 01.2.5 Methods of collecting and analysing data
- 01.2.6 Accur of mapping
- 01.3 Terminology
- 01.4 Summary
- 01.5 Questions for practice

## Unit 67: Root cause Analysis

### Structure

- 01.00 Introduction
- 01.1 Introduction
- 01.2 Subject Interpretation
- 01.2.1 Importance of RCA
- 01.2.2 Investigation with thought
- 01.3 Terminology
- 01.4 Summary
- 01.5 Questions for practice

## Unit 88: Case studies of accident investigation

### Structure

88.0 Introduction

88.1 Overview

88.2 Case study: Investigation

88.3 Further case studies of accident investigation

88.4 Examples

88.5 Summary

88.6 Exercises

88.7 Questions and answers



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**SEMESTER- VII  
ENVIRONMENTAL COMPLIANCE**

## Semester -7

### Environmental Compliance

Semester -7	Course Title
Unit - 01	Hazardous Waste and Other Wastes Rules
Unit - 01	Bio-Medical Waste Rules
Unit - 01	E-Waste Rules & Batteries Rule
Unit - 02	EPR Legislation (Plastic & E Waste)

## **Unit 22: Hazardous Waste and Other Waste Rules/Structure**

- 22.0 Objective
- 22.01 Introduction
- 22.1 Subject introduction
- 22.1.1 Detailed problems to set
- 22.1 Technology
- 22.2 Summary
- 22.3 Question for practice

## **Unit 23: Bio-Medical Waste Rules**

### **Structure**

- 23.0 Objective
- 23.01 Introduction
- 23.1 Subject introduction
- 23.1.1 Detailed problems to set
- 23.1 Technology
- 23.2 Summary
- 23.3 Question for practice

### **23.01.1 Waste Rules & Structure Rule**

- 23.01 Objective
- 23.01.1 Introduction
- 23.1 Subject introduction
- 23.1.1 Detailed problems to set
- 23.1 Technology
- 23.2 Summary
- 23.3 Question for practice

### **23.01.2 Guidelines (Part 1 & 2)**

- 23.01 Objective
- 23.1 Introduction
- 23.1 Subject introduction
- 23.1.1 Detailed problems to set
- 23.1 Technology
- 23.2 Summary
- 23.3 Question for practice



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**SEMESTER- VII  
SAFETY IN OIL & GAS INDUSTRY**

## Semester7

### Safety in Oil & Gas industry

Semester - 7	Course Title
Unit - 03	Introduction to Oil and Gas Industry
Unit - 04	Natural Gas Processing Licensing Policy
Unit - 05	Fire, Explosion in Oil & Gas Industry
Unit - 06	Emergency Response in Oil & Gas Industry

#### **Unit 10: Introduction to Oil and Gas Industry**

##### **Objectives**

- 10.1 objectives
- 10.2 Introduction
- 10.3 Subject Introduction
- 10.3.1 Overview of the Oil and Gas Industry
- 10.3.2 Upstream and Refining
- 10.3.3 Refining and Processing
- 10.3.4 Transportation and Distribution
- 10.4 Technology
- 10.4 Summary
- 10.5 Questions

#### **Unit 11: National Petroleum Licensing Policy**

##### **Objectives**

- 11.1 objectives
- 11.2 Introduction
- 11.3 Subject Introduction
- 11.3.1 Policy Framework and Subdivisions
- 11.3.2 Licensing Process and Criteria
- 11.3.3 New competencies for exploration/production WOP
- 11.3.4 Role of Government and Stakeholders
- 11.3.5 Impact on Economic Growth
- 11.4 Technology
- 11.4 Summary
- 11.5 Questions for practice

#### **Unit 12: Investigation of an Oil and Gas Industry**

##### **Objectives**

- 12.1 objectives
- 12.2 Introduction
- 12.3 Subject Introduction
- 12.3.1 Oil Reservoirs: Oil and Gas Operations
- 12.3.2 Injection Wells and Production Well Logs
- 12.3.3 Drilling Equipment and Techniques
- 12.3.4 Logging and Production for Reservoirs
- 12.3.5 Data and Reservoir Modelling as a Strategy
- 12.4 Technology
- 12.4 Summary
- 12.5 Questions

#### **Unit 13: Emergency Response in Oil and Gas Industry**

##### **Objectives**

- 13.1 objectives
- 13.2 Introduction
- 13.3 Subject Introduction
- 13.3.1 Emergency Response Planning and Preparedness
- 13.3.2 Risk Assessment and Hazard Identification
- 13.3.3 Incident Command System (ICS) in Emergency
- 13.3.4 Emergency Response Team (ERT) Roles
- 13.3.5 Drilling and Operation Control Measures
- 13.3.6 Evaluation of Incidents and Safety Monitoring Areas
- 13.3.7 Communication during Emergency Incidents

W.2.1 Knowledge

W.2.2 Summary

W.2.3 Questions

# Semester-7

## Practical - 8

Sr. No	Practical
1	Determination of dissolved oxygen and bio-chemical oxygen demand
2	Conduct Safety Locker Inspection
3	Conduct Inspection of MSHA
4	Case studies on Mining Disasters & major fire accidents



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**SEMESTER- VIII  
FIRE RISK ASSESSMENT**

## Semester - 8

### Fire Risk Assessment

Semester - 8	Course Title
Unit - 07	Fire Risk Assessment and Fire Audit
Unit - 08	Passive Fire Protection Systems
Unit - 09	Active protection
Unit - 10	Fire extinguishment

## Unit 10: Fire Risk Assessment and Fire Audit

### Structure

#### 1.0 Objective

#### 1.1 Introduction

#### 1.2 Consideration in the Assessment of Subsequent Capital of having a Provision of Fire Risk Assessment

##### a. Risk Classification

##### a. Fire Hazard

##### a. Different Steps in Fire Risk Assessment

#### 1.3 Introduction to Fire Audit

##### a. Fire Load Calculation

#### 1.4 Summary

#### 1.5 Questions for Practice

## Unit 11: Fire Protection Systems

### Structure

#### 1.0 Objective

#### 1.1 Introduction

#### 1.2 Fire Protection of Building and Means of Escape

##### a. Fire-rated Glass

##### a. Fire Doors

##### a. Protection to Stairs and

##### a. Fireproofing Materials

#### 1.3 Summary

#### 1.4 Questions for Practice

## Unit 12: Active Fire Protection Systems

### Structure

#### 1.0 Objective

#### 1.1 Introduction

#### 1.2 Fire Alarm System

#### 1.3 Radiant Detectors

#### 1.4 Chemical Flame Detectors

#### 1.5 Thermal Detectors

#### 1.6 Ionisation Detectors

#### 1.7 Air Sampling Detectors

#### 1.8 Automatic Sprinkler System

#### 1.9 Summary

#### 1.10 Questions for Practice

## Unit 13: Fire Containment

### Structure

#### 1.0 Objective

#### 1.1 Introduction

#### 1.2 Different Types of Fire Containment

#### 1.3 Importance and Hierarchy of Fire Containment

#### 1.4 Fire Containment Strategies

#### 1.5 Role of Fire Brigades in Individual Fire Containment

#### 1.6 Summary

#### 1.7 Questions for Practice



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**SEMESTER- VIII  
DISASTER RECOVERY & BUSINESS  
CONTINUITY PLANNING**

## Semester - 8

# Disaster Recovery & Business Continuity Planning

Semester - 8	Course Title
Unit - 101	Introduction to Disaster Management
Unit - 102	Insurance in Disaster Management
Unit - 103	The Disaster Management Act
Unit - 104	Natural & Accident-related Disasters

**Unit 10: Introduction to Disaster Management**

**Objectives**

- 1.0 Disaster
- 1.1 Identification
- 1.2 Types and Consequences of Major Natural Hazards
- 1.3 Role of Management, Local Authorities, and Public
- 1.4 Disaster Management: International Context

- Prevention
- Mitigation
- Preparedness

1.5 Recovery

1.6 Questions for Practice

**Unit 11: Disaster Management**

**Objectives**

- 1.0 Disaster
- 1.1 Introduction
- 1.2 Role of International Cooperation (UNDRR & UN Agreement)
- 1.2.1 Disaster Preparedness Due to Disaster
- 1.2.2 Need for National Capacity Building
- 1.3 Disaster Knowledge Network
- 1.4 Disaster
- 1.5 Questions for Practice

**Unit 12: The Disaster Management Act**

**Objectives**

- 1.0 Disaster
- 1.1 Introduction
- 1.2 Need for Technological Support in Disaster Mitigation
- 1.3 Computer-Based Disaster Preparedness Program
- 1.4 Preparation of Disaster Management Plan
- 1.5 Early Warning System
- 1.6 Role of Information Technology (IT)
- 1.7 Disaster
- 1.8 Questions for Practice

**Unit 14: Natural & Anthropogenic related Disasters**

**Objectives**

- 1.0 Disaster
- 1.1 Introduction
- 1.2 Definition
- 1.3 Major Disasters
- 1.4 Floods and Other Natural Disasters
- 1.5 Disaster Preparedness of Some Highly Hazardous Chemicals
- 1.6 Industrial Disasters (Leak or Over-Load Release)
- 1.7 Fire or Explosions
- 1.8 Disaster Management Authorities
- 1.9 Disaster
- 1.10 Questions for Practice



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**SEMESTER- VIII**  
**EMERGENCY PLANNING & RESPONSE**

## Semester - 8

### Emergency Planning & Response

Semester - 8	Course Title
Unit - 107	Introduction to Industrial Emergencies
Unit - 108	Emergency Planning
Unit - 107	Emergency Mock Drill
Unit - 108	Onsite Emergency Plan

## Unit 188: Introduction to Industrial Emergencies

### Structure

- EN19 - objectives
- EN1 - Introduction
- EN2 - Subject Introduction
- EN2.1 Overview of Industrial Emergencies
- EN2.1.1 Types of Industrial Hazards and Emergencies
- EN2.1.2 Cases of Industrial Accidents
- EN2.1.3 Risk Assessment in Industrial Settings
- EN2.1.4 Industrial Safety Regulations and Standards
- EN2.1.5 Emergency Response Plans for Industrial Facilities
- EN3 - Technology
- EN4 - Summary
- EN5 - Evaluation exercises

## Unit 189: Emergency Planning

### Structure

- EN19 - objectives
- EN1 - Introduction
- EN2 - Subject Introduction
- EN2.1 Introduction to Emergency Planning
- EN2.1.1 Types of Emergencies and Disasters
- EN2.1.2 Risk Assessment and Analysis
- EN2.1.3 Emergency Response Framework
- EN2.1.4 Developing an Emergency Plan
- EN2.1.5 Communication Strategies in Crisis Situations
- EN2.1.6 Evacuation Plans and Procedures
- EN3 - Technology
- EN4 - Summary
- EN5 - Evaluation exercises

## Unit 190: Emergency Mock Drills

### Structure

- EN19 - objectives
- EN1 - Introduction
- EN2 - Subject Introduction
- EN2.1 Introduction to Emergency Mock Drills
- EN2.1.1 Importance of Conducting Mock Drills
- EN2.1.2 Types of Emergency Mock Drills
- EN2.1.3 Planning and Preparation for Mock Drills
- EN2.1.4 Setting Objectives for Mock Drills
- EN3 - Technology
- EN4 - Summary
- EN5 -

## Unit 100: Crisis Emergency Plan

### Structure

EN1: objectives

EN1: introduction

EN1: subject presentation

EN1.1 Introduction to Crisis Emergency Planning

EN1.2 Importance of a Crisis Emergency Plan

EN1.3 Legal and Regulatory Requirements for Crisis Emergency Plans

EN2: Terminology

EN2: Summary

EN2: Questionnaire answer



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**SEMESTER- VIII  
ENVIRONMENTAL SUSTAINABILITY**

## Semester - 8

### Environmental Sustainability

Semester - 8	Course Title
Unit - 108	Fundamentals of Sustainability
Unit - 110	Environmental Audits
Unit - 111	Introduction to CSR
Unit - 112	Global Reporting Initiative (GRI)

## Unit 10: Fundamentals of Sustainability

### Structure

- 10.0: Overview
- 10.1: Introduction
- 10.2: Subject - Introduction
- 10.2.1 Introduction to Sustainability
- 10.2.2 Key Principles of Sustainability
- 10.2.3 The Three Pillars of Sustainability: Environmental, Social, and Economic
- 10.2.4 Sustainable Development Goals (SDGs)
- 10.3: Knowledge
- 10.4: Summary
- 10.5: Question/answer

## Unit 11: Environmental Audit

### Structure

- 11.0: Overview
- 11.1: Introduction
- 11.2: Subject - Introduction
- 11.2.1 Introduction to Environmental Audit
- 11.2.2 Types of Environmental Audit
- 11.2.3 Importance and Benefits of Environmental Audit
- 11.2.4 Legal and Regulatory Framework for Environmental Audit
- 11.3: Knowledge
- 11.4: Summary
- 11.5: Question/answer

## Unit 12: Introduction to CSR

### Structure

- 12.0: Overview
- 12.1: Introduction
- 12.2: Subject - Introduction
- 12.2.1 Overview of Corporate Social Responsibility (CSR)
- 12.2.2 The Evolution of CSR in Business Practice
- 12.2.3 Key Concepts and Principles of CSR
- 12.2.4 The Business Case for CSR
- 12.2.5 The Three Pillars of CSR: Environmental, Social, and Economic
- 12.2.6 CSR and Ethical Business Practices
- 12.3: Knowledge
- 12.4: Summary
- 12.5: Question/answer

## Unit 13: Global Reporting Initiative (GRI)

### Structure

- 13.0: Overview
- 13.1: Introduction
- 13.2: Subject - Introduction
- 13.2.1 Introduction to the Global Reporting Initiative (GRI)

- 112.1 The Evolution of GRI Standards
- 112.2 The Importance of Sustainability Reporting
- 112.3 GRI's Core Principles and Framework
- 112.4 Understanding GRI Standards: Overview and Structure
- 112.5 The GRI Reporting Topics and Indicators
- 112.6 Knowledge
- 112.7 Summary
- 112.8 Questionnaire practice

# Semester-9

## Practical - 9

Sr. No	Practical
1	Conduct Safety Risk Assessment of any workplace
2	Conduct Fire Risk Assessment
3	Conduct Root Cause Analysis for any incident
4	Fire Detection Systems Lab



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**PRACTICALS**

**SEMESTER 1**

**TO**



**SEMESTER 8**

# INDEX

Session	Course Title	Credits
Session 1	<b>Practical 1</b>	1
	Operation of Dry Chemical Powder Fire Extinguisher	
	Operation of CO <sub>2</sub> Fire Extinguisher	
	Conduct Safety Labels Inspection	
	Operation of Fire Extinguisher	
Session 2	<b>Practical 2</b>	2
	Measurement of Cold Environmental Condition at Work place	
	Measurement of Hot Environmental Condition at Work place	
	Conduct Heat stress Assessment (Asst)	
	Demonstrate the Use of First Aid Kit at Work	
Session 3	<b>Practical 3</b>	1
	Identify the use of particulate in workplace	
	Measurement of Noise level from various sources	
	Measurement of Frequency of Noise	
	Measurement of High noise and low frequency noise level	
Session 4	<b>Practical 4</b>	2
	Measurement of whole body vibration from various sources	
	Identification of sources of vibration	
	Conduct VFI Audit	
	Conduct for VFI Audit at workplace	
Session 5	<b>Practical 5</b>	2
	Measurement of light emitted by different chemicals in optical wavelength	
	Measurement of formaldehyde and benzene from work place	
	Measurement of H <sub>2</sub> sulphide from gas levels at work place; the gases causing the human health hazard	
	Demonstrate the use of LOTO Procedure	
Session 6	<b>Practical 6</b>	2
	Measurement of Light intensity using lux meter	
	Develop the Standard Operating Procedure (SOP) of manual handling of any equipment	
	Prepare the Safe Working Instruction on job handling	
	Prepare a MSDS report of the material used	
Session 7	<b>Practical 7</b>	2
	Conduct Machine Guarding Audit for different machines	
	Preparation of Job Safety Analysis plan for a industry	
	Demonstrate of Electrical safety and Bio-chemical safety (Asst)	
	Prepare Safety Audit Report and Conduct the Audit	
Session 8	<b>Practical 8</b>	2
	Conduct HSE Audit	
	Inspection of fire extinguisher	
	Conduct inspection of SC, AII	
	Conduct audit on Mining Operation & report the results	

Lesson 2	Practical 3	2
	Conduct Safety Risk Assessment of any workplace	
	Conduct Fire Risk Assessment	
	Conduct Root Cause Analysis for any incident	
	Investigation Scenario Lab	
	Conduct Investigation/ Audit of any industry	