

M.B.A. (SAFETY MANAGEMENT)

RULES / REGULATIONS AND SYLLABUS

Objectives

The Master of Business Administration (Safety Management) Degree Programme of the Annamalai University is to equip practicing Executives and Managers, working in Private / Public Sector Undertakings / Banks/ Educational Institutions. Industries and other similar organisations so as to enable them to enrich their managerial skills, decision-making, and to enhance their problem solving ability, through case studies, lectures, role-plays and business games with special focus on Safety Management.

The Programme of Study Duration

The duration of the programme of study is two years and students shall complete the programme within a period of 7 years from the year of admission and the programme will comprise the subjects given in regulations.

Medium of Instruction

English will be the medium of instruction for the programme.

Eligibility for Admission

1. Any Graduation
2. Applicants who have qualified themselves in P.G. Diplomas in Management of any University / or any recognized institute and those who have worked in Managerial / Executive / Supervisory cadre in a Manufacturing / Marketing / Banking / Service organizations will be given preference.

Award of the Degree

Candidates for the M.B.A. (Safety Management) Degree shall be required to pass the examination held by the University after undergoing the prescribed programme of study through Distance Education.

Personal Contact Programme (Compulsory)

Personal Contact Programme is arranged at different centres for the benefit of the students. The minimum number of days to be conducted in a

year is 60 days. It is compulsory for students to attend 80% of the days. In the second year Special lectures / Case Studies / Group Discussions / Role Plays / Management Games / In-Basket Exercises / Brain Storming classes will be conducted. Teaching will be through study materials sent to the students supplemented by face to face contact programmes, guest lectures and audio and video cassettes.

Course Contents

First year

- 1.1 Principles of Managements and Organizational Behaviour.
- 1.2 Human Resource Management.
- 1.3 Marketing Management.
- 1.4 Financial Management.
- 1.5 Fundamentals of Safety.
- 1.6 Safety and the Law.
- 1.7 Fire Engineering.
- 1.8 Safety in Construction Industry.

Second Year

- 2.1 Safety Management.
- 2.2 Safety Engineering.
- 2.3 Appraisal, Analysis, Inspection and Control Procedures.
- 2.4 Industrial Hygiene and Occupational Health.
- 2.5 Environmental Education.
- 2.6 Production and Materials Management.
- 2.8 Project and Viva-voce Examinations

(or)

2.7.1 Safety in Chemical Industry

2.7.2 Safety in Electrical Industry

Scheme of Examinations

The total marks for each course is 100. In lieu of Project work and Viva-voce students can appear for two theory courses each 100 marks.

| Course | Duration | Max. Marks Written Examination + Assignment | Min. Marks for a Pass |
|-------------------|-----------------|--|----------------------------------|
| First Year | | | |
| Course 1.1 | 3 hours | 75 + 25 | 50 |
| Course 1.2 | 3 hours | 75 + 25 | 50 |
| Course 1.3 | 3 hours | 75 + 25 | 50 |
| Course 1.4 | 3 hours | 75 + 25 | 50 |
| Course 1.5 | 3 hours | 75 + 25 | 50 |

| | | | |
|--------------------|-------------------------------|----------|-----|
| Course 1.6 | 3 hours | 75 + 25 | 50 |
| Course 1.7 | 3 hours | 75 + 25 | 50 |
| Course 1.8 | 3 hours | 75 + 25 | 50 |
| Second Year | | | |
| Course 2.1 | 3 hours | 75 + 25 | 50 |
| Course 2.2 | 3 hours | 75 + 25 | 50 |
| Course 2.3 | 3 hours | 75 + 25 | 50 |
| Course 2.4 | 3 hours | 75 + 25 | 50 |
| Course 2.5 | 3 hours | 75 + 25 | 50 |
| Course 2.6 | 3 hours | 75 + 25 | 50 |
| Course 2.7.1 & | Safety in Chemical Industry | 100 | 50 |
| Course 2.7.2 | Safety in Electrical Industry | 100 | 50 |
| Course 2.8 | Project work and viva voce | 150 + 50 | 200 |

Passing Minimum

At the end of each year of study, candidates shall have to take their examination in all the courses they studied during that year.

A candidate shall be declared to have passed the examination if he / she obtains not less than 50 per cent of marks in each course. Candidates securing less than prescribed pass minimum shall be deemed to have failed in the written examination of that year.

However, he / she shall be required to appear again for those courses only in which he / she has failed in order to get a pass in the subsequent examination.

A candidate who opts for project work shall be declared to have passed in the Project Work and Viva-voce Examination, if he / she secures an overall minimum of 50 per cent (combining both project work and the Viva-Voce) out of 200 marks.

A candidate who fails in the project work and Viva-Voce examination may be permitted to resubmit a project and appear for the Viva-Voce for the second time, if so recommended by the examiners. No Candidate shall be permitted to submit the project work and appear for the Viva-Voce more than twice on additional fee payments.

Classification Norms

First Class: Candidates securing 60% and above in aggregate in the whole examination shall be placed in the First class,

Second Class: Those who obtain 50% and above but less than 60% shall be placed in the Second Class,

Candidate who obtains 75% in aggregate shall be deemed to have passed the examination with distinction, provided they pass all examinations prescribed for the programme in the First appearance itself.

For unsuccessful candidates

Candidates who failed in any course in the First year, will be permitted to proceed to the second year.

If a candidate fails in any of the theory courses he / she shall be required to reappear for that course(s) only.

Conditions for Admission

Candidates for admission to **Two year Post Graduation** Course in Safety Management should have passed the following examinations

1. Graduation (Any Stream)/ B.E / B.Tech (Any Stream)

Medium of Instruction

English will be the medium of instruction for the course.

Passing Requirements

A candidate passing in all subjects will be classified as follows

| | Marks | Classification |
|---|----------------------------------|------------------------------|
| a | 50% and above but less than 60% | Second Class |
| b | 60% and above, but less than 75% | First Class |
| c | 75% and above | First Class with Distinction |

A candidate will be declared to have passed the examination in First Class or First Class with Distinction if he/she has passed all the courses in the first appearance and obtained an aggregate of not less than 60 or 75% of marks respectively.

SCHEME OF EXAMINATIONS

There will be two examinations each year, one regular, one supplementary.

| Cours e | Subjects | Hou rs | Mark s | Minimu m for a pass |
|--------------------|--|-------------------|-------------------|------------------------------------|
| 1.1 | Principles of Management & Organizational Behaviour | 3 | 100 | 50 |
| 1.2 | Human Resource Management | 3 | 100 | 50 |
| 1.3 | Marketing Management | 3 | 100 | 50 |
| 1.4 | Financial Management | 3 | 100 | 50 |
| 1.5 | Fundamentals of Safety | 3 | 100 | 50 |
| 1.6 | Safety and the Law | 3 | 100 | 50 |
| 1.7 | Fire Engineering | 3 | 100 | 50 |
| 1.8 | Safety in Construction Industry | 3 | 100 | 50 |
| 2.1 | Safety Management | 3 | 100 | 50 |
| 2.2 | Safety Engineering | 3 | 100 | 50 |
| 2.3 | Appraisal, Analysis, Inspection & Control Procedures | 3 | 100 | 50 |
| 2.4 | Industrial Hygiene & Occupational Health | 3 | 100 | 50 |
| 2.5 | Environmental Education | 3 | 100 | 50 |

| Course | Subjects | Hours | Marks | Minimum for a pass |
|---------------|-----------------------------------|--------------|--------------|---------------------------|
| 2.6 | Production & Materials Management | 3 | 100 | 50 |
| 2.7.1 | Safety in Chemical Industry | 3 | 100 | 50 |
| 2.7.2 | Safety in Electrical Industry | 3 | 100 | 50 |
| 2.8 | Project Work and viva-voce | | 200 | 100 |

SYLLABUS

COURSE 1.1: PRINCIPLES OF MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR

Objectives

On successful completion of the course the students should have:

- 1 Understood the principles and functions of management

- 2 Learnt the scientific decision making process and problem solving techniques.
- 3 Learnt modern management process.
- 4 Learnt behavioural aspects of an individual in the organization.

Unit-I

Management: Science, Theory and Practice – The Evolution of Management Thought and the Patterns of Management Analysis – Management and Society: Social Responsibility and Ethics – Global and Comparative Management – The Basis of Global Management – Functions of Management – The Nature and Purpose of Planning – Objectives – Strategies, Policies and Planning Premises – Decision Making – Global Planning.

Unit-II

The Nature of Organising – Organizational structure: Departmentation – Line / Staff Authority and Decentralization – Effective Organizing and Organizational Culture – Global Organizing. Co-ordination functions in Organization – Human Factors and Motivation – Leadership – Committees and group Decision Making – Communication – Global Leading.

Unit-III

The System and Process of Controlling – Control Techniques and Information Technology – Global Controlling and Global Challenges – Direction Function – Significance.

Unit-IV

Organizational Behaviour : History – Evaluation, Challenges & Opportunities, Contributing disciplines, management functions and relevance to organization Behaviour. Organizational Behaviour responses to Global and cultural diversity.

Personality – Determinants, structure, behaviour, assessment, psycho-analytical social learning, job-fit, trait theories.

Emotions and Emotional Intelligence as a managerial tool. Attitude – relationship with behaviour, sources, types, consistency, work attitudes, values – importance, sources, types, ethics and types of management ethics.

Perception – Process, Selection, Organization Errors, Managerial implications of perception. Learning – classical, operant and social cognitive approaches. Implications of learning on managerial performance.

Unit–V

Stress – Nature, source, Effects, influence of personality, managing stress – Conflict – Management, Levels, Sources, bases, conflict resolution strategies, negotiation. Foundations of group behaviour: team decision making. Issues in Managing teams.

Unit–VI

Organizational change – Managing planned change. Resistance to change – Approaches to managing organizational change – Organizational Development – values – interventions, change management – Organizational culture – Dynamics, role and types of culture and corporate culture.

REFERENCE

- 1 Koontz & Weirich, Essentials of Management, Tata McGraw Hill Publishing Company, New Delhi.
- 2 Stoner, Freeman & Gilbert, Management, PHI, 6th Edition.
- 3 Robbins. S.P., Fundamentals of Management, Pearson, 2003.
- 4 Robbins. S. Organizational Behaviour, X edn., Prentice-Hall, India.
- 5 Umasekaran, Organizational Behaviour.
- 6 VSP Rao, V. Hari Krishna – Management: Text and Cases, Excel Books, 1 Edition, 2004.

COURSE 1.2: HUMAN RESOURCE MANAGEMENT

Objectives

The objective of the course is to enlighten the students with the challenges that organization face today like organization downsizing, workforce diversity, shortages of skilled workers and other concerns. It is the people who staff and manage organization. HRM involves the application of management functions and principles which are applied towards acquisition, development, retention and compensation of employees in organization.

Unit–I : Introduction

Human Resource Management – Importance – Challenges – Line and Staff aspect – HR management activities – Role of personnel manager – Images and qualities of HR manager – Integration of employee / management interests – Harvard frame work of HRM – Environment of Human Resource Management – External forces, internal forces, Environment scanning.

Unit–II : Human Resource Planning

Human resource Planning – Importance – future personnel needs, creating talented personnel, foundations for personnel functions – factors affecting HRP – HR supply/ demand forecast – Recruitment – Factors affecting recruitment – Recruitment policy – Internal / External sources of recruitment – Methods of recruitment – selection procedure – orientation program.

Unit–III : Job Analysis, Job design and job evaluation

Job analysis – Content, steps in job analysis, methods of collecting job data, potential problems with job analysis – Factors affecting job design – Job design approaches – Job specification – Job evaluation – Basic procedure, advantages, Limitations of Job evaluation – Job evaluation methods.

Unit–IV : Training, Promotion and Compensation

Distinction between training and development – Inputs in T&D – Skills, education, development, ethics, attitudinal changes, decision making skills – Gaps in training – principles of learning – learning curve – The training process – Evaluation – Training methods / techniques – On the job training, Off the job training – Management Development – Pedagogical approaches and techniques of management development – Promotion – Promotion policy – Types of Promotion – Basis of Promotion – Seniority – Merit – Ability – transfers – reasons, principles, types – Separation – Lay off, resignation, dismissal, retrenchment, voluntary retirement scheme – Components of remuneration – wages and salary, incentives, fringe benefits, perquisites, non monetary benefits – factors affecting employee remuneration – Minimum wage, fair wage, living wage – executive remuneration.

Unit–V : Performance Appraisal, Morale and Employee Motivation

What should be appraised – Traditional methods of performance appraisal – Modern methods of appraisal – MBO process – Appraisal techniques failure – Ethics of appraisal – Potential appraisal – Potential attributes – Career planning and development – succession planning – Motivation and morale – Demotivation of employees – Performance Vs motivation – Incentive Vs motivation – Retention determinants – Organizational components, organizational career opportunities, Attrition-Objectives- Problems and Benefits, Rewards and retention, Employee relationship.

Unit–VI : Quality of work life and Participative Management

Scope and ways of participation – Board level, ownership, complete control, staff council, joint council, collective bargaining, Job enlargement/enrichment, suggestion schemes, quality circle – Total quality management – Structure of participative management – Nature and benefits of participation – managing diversity – gender issues in equal employment – Quality of work life – Role of supervisor in QWL – Safety – Types of accidents – Safety programs – Work place health issues – Work place violence – outsourcing HR activities.

Text Books

- 1 C.B. Mamoria, S.V. Gankar, Human resource management, Himalaya Publishing House, Mumbai, 2006
- 2 Robert L.Mathis, John H. Jackson, Human resource management, Thomson, New Delhi, 2004
- 3 Rao .P.L, Comprehensive human Resource management, Excel Books, new Delhi, 2006
- 4 K. Ashwathappa, Human resource management, Tata McGraw-Hill, New Delhi, 2005
- 5 Biswajeet Pattanayak, Human resource Management, PHI Learning, New Delhi, 2008
- 6 Arun Monappa, managing human Resources, Macmillan India Ltd, New Delhi, 2003

- 7 Subba rao, P., Personal and Human resource Management, Himalaya Publishing House, Mumbai, 2004.

Reference Books

- 1 Khanka, S.S, Human resource Management, S.Chand & Company Ltd, New Delhi, 2003
- 2 R.S. Dwivedi, Human Relations and Organizational behavior, Macmillan, New Delhi, 2005
- 3 Raymond A Noe, John R Hollenbeck, Barry Gerhart, Patrick M Wright, Human Resource Management, Tata McGraw-Hill, New Delhi, 2006
- 4 Ivancevich, Human resource management, Tata McGraw-Hill, New Delhi, 2003.

COURSE 1.3: MARKETING MANAGEMENT

Objectives

To acclimatize the participants about the environment of market, consumer behavior and to develop the ability to design the best marketing strategy by analyzing the factors influencing the purchase decision.

Unit-I : Marketing and its Environment

Definition – Role of marketing – Concepts of marketing – Production concept – Product concept – Selling concept – Marketing concept – Societal concept; Tasks of Marketing; Marketing Environment – Macro and Micro Environment – Marketing strategies – Market Leader Strategies – Market follower Strategies - Market Challenger Strategies and Market Niche Strategies.

Unit-II : Market Analysis and Segmentation

Market Analysis – Types of Markets – Marketing mix elements – Portfolio Planning – Demand forecasting methods – Surveys – Buyer's opinion – Composite Sales force opinion – Experts opinion – Market test method.

Market Segmentation – Bases of Segmenting Consumer Market and Industrial Market – Target Marketing – Product differentiation – Market Positioning Strategy.

Unit–III : Consumer Behaviour and CRM

Consumer Behaviour – Factors influencing Consumer Behaviour - Demographics -Psychographics – Behavioural – Psychological influence – Purchase decision process – Strategies – Family decision making – Stages in buying process – Dissonance behaviour. Customer Relationship Management – Relationship Marketing.

Unit–IV : Product and Pricing Strategies

Product – Classification of consumer goods and Industrial goods – Product lines – Product Life Cycle – New Product Development – Launching New Product – Product Innovation; Brand – types; Packaging – Labeling Trade Marks – Copyrights – Patents. Pricing Strategy – Methods of Setting Price – Discounts and Allowance.

Unit–V : Physical Distribution and Promotion

Marketing Channels – Direct Marketing – Industrial Marketing – Network Marketing – e-marketing – B₂B – B₂C. Distribution Network – Channel Management – Retailing – Wholesaling – Promotion – Advertising – Publicity – Sales Promotion Methods.

Unit–VI : Sales Force Management and Other Entities

Sales force Management – Qualities of Sales Manager – Performance Evaluation of Marketing Programmes; Marketing Research – Process – MIS; Ethics in Marketing – Consumerism – Environmentatism – Global Marketing – Services Marketing.

Text Books

- 1) Monga G. S., Marketing Management, New Delhi, Deep & Deep Publication, 2004.
- 2) Philip Kotler: Fundamentals of Marketing, New Delhi, Pearson Publishers, 3rd, 2001.
- 3) Philip Kotler: Marketing Management, New Delhi, Prentice Hall of India (P) Ltd., 11th edition, 2001.
- 4) William J. Stanton: Fundamentals of Marketing, New Delhi, McGraw Hill Publishers, 9th ed., 1998.

Reference Books

- 1) Rajan Saxena. Marketing Management, TATA McGraw Hill, Third Edition, New Delhi, 2006.
- 2) William D. Perreault, E. Jerome McCarthy. Basic Marketing, TATA McGraw Hill, 15th Edition, New Delhi, 2006.
- 3) Coughlan et al: Marketing Channels, New Delhi, Prentice Hall of India (P) Ltd., 6th ed., 2001.
- 4) Philip Kotler and Gary Armstrong: Principles of Marketing, New Delhi, Prentice Hall of India (P) Ltd., 9th ed., 2002.
- 5) Ramaswamy and Namakumari: Marketing Management – Planning, Implementation and Control, Global Perspective Indian Context, New Delhi, Macmillan Publishing Co., 3rd ed., 2000.
- 6) Shalini Anand, Marketing Management, New Delhi, Deep & Deep Publication, 2004.

COURSE 1.4 : FINANCIAL MANAGEMENT

Objectives

Finance is concerned with everything that takes place in the conduct of the business. Obviously this subject seeks to develop and acquaint the students with the various concepts, techniques, and methods of planning, forecasting, effective utilisation of appraisal evaluations. This will develop and improve the decision making ability in the area of finance.

Unit–I : Introduction to Financial Management

Finance function: Meaning – Definition – Scope of Finance function – Executive functions and Incidental functions – Goals of Financial Management – Profit maximisation and Wealth maximisation.

Unit–II : Short–Term Financing

Sources of short term financing: The Management of working capital – Meaning of working capital - Net working capital – Financing mix approaches - Sources of working capital financing – Management of cash and marketable security: Importance of cash and liquidity – Cash balance deciding factors – Determination of cash cycle – Cash turn over – Cash management strategies – working capital control – Receivable management - Inventory management.

Unit–III : Long–Term Financing

Sources of long term financing – Nature of long term financing – Common stock – Preferred stock – Debt financing – Secured and Unsecured debts – Repurchase of shares - Under writing of shares - Rights issue: Meaning – Procedure – Pricing – Underwriting of rights – Dilution of market price rights – Market price of shares.

Unit–IV : Dividend Policy Decision

Dividend policy decision: Internal financing – Dividend and Retained earnings – M. M. Model – Walters model – Cost of retained earnings – Dividend practices – Factors affecting dividend policy – Dividend payout ratio – Stock dividend and Stock splits – Issue of bonus shares and its procedure.

Unit–V : Leasing

Leasing: Characteristics of leasing – Leasing as a source of finance – Types of Leasing – Leasing arrangements – Advantages and Disadvantages – Hire – Purchase – Meaning and Characteristics – Hire – Purchase vs Instalment payment – Taxation aspects - Mergers and Acquisitions.

Unit–VI : Cost of Capital and Capital Structure

Cost of Capital – Significance – Determining Component of Cost of Capital – Weighted Average Cost of Capital – Flotation Costs – Capital Structure – Features of an appropriate capital structure – Determinants of the capital structure – The Modigliani – Miller Hypothesis – No taxes – The M-M Hypothesis under corporate taxes – Analysis of capital structure in practice.

Text Books

- 1 Chandra Prasanna: Financial Management – Theory and Practice, New Delhi, Tata McGraw Hill Publishing Co., 4th ed., 1997.
- 2 Diwan P., Financial Management, New Delhi, Deep & Deep Publication Pvt., Ltd., 2003
- 3 Khan M.Y. and Jain P.K.: Financial Management – Text and Problems, New Delhi, Tata McGraw Hill Publishing Co., 2nd ed., 1992.

Reference Books

- 1 John C. Hull; Options, Futures and other Derivative Securities: New Delhi, Prentice Hall of India Pvt. Ltd., 2nd ed., 1996.
- 2 Pamela P. Peterson: Financial Management and Analysis, New York, McGraw Hill, Inc., International ed., 1994.
- 3 Rao P.M: Financial Management : New Methods and Practices, New Delhi, Deep & Deep Publication (P) Ltd., 1999.
- 4 Van Horne. James C: Financial Management and Policy, New Delhi, Prentice Hall of India Pvt. Ltd., 10th ed., 1996.
- 5 Kuchhal S C: Financial Management, Allahabad, Chaitanya Publishing House, 2004.

COURSE 1.5 : FUNDAMENTALS OF SAFETY

Objectives

This course will enable the students to know about history of accidents, personal protective equipment, work permit system, color coding, barricading, tag system and chemical safety. He is also made aware of risk, hazards, accidents and illnesses related to common day to day, industrial activities and jobs and ways to prevent / protect themselves from such situations. It also highlights man commitment to environmental well – being.

Unit–I : History of Accidents

Introduction to Safety, History of an Accident, Types of Accidents, Causes of Accidents, Cost of an Accident, Accident prevention measures (5Es, 4Ps etc)

Unit–II : Personal Protective Equipment (PPE)

Introduction to Personal Protective Equipment; Types of Personal Protective Equipment, Selectivity of PPE, Prerequisites of PPE, Care and Maintenance of PPE (Training or activity)

Unit– III: Work Permit System

Introduction to work permit system, Types of work permits, conditions to permit, checklist to work permit system.

Unit–IV : Electrical Hazards

Introduction to Electricity, Hazards associated with electricity, safe measures to electricity, static electricity, earthing, how the human body effecting to electricity, lock out.

Unit–V : Warning Systems and Barricading

Introduction to warning systems, color coding, barricading standards, tag system, Introduction to Indian Standard Organization (ISO), Occupational Safety Health Administration (OSHA), Process Safety Management (PSM), Safety Management System (SMS)

Reference Books

Industrial Safety Health and Environmental Management system
Publication: Khanna Publishers, Authors: R.K Jain and Sunil S. Rao

Industrial Safety Management Publication: Tata Mc Graw-Hill
Publishing Company Ltd. Author: L. M. Deshmukh

ABC of Industrial Safety Remember ABC Publication: MEEDS Author:
V P M Mani.

Industrial Accident Prevention – Publication: Mc Graw-Hill – Author:
Herbert William Heinrich.

Fire and Explosion Hazards Handbook of Industrial Chemicals
Publication: Jaico Publishing House Author: Tatyana A. Devletshina &
Nicholas P. Cheremisinoff, Ph. D.

COURSE 1.6 : SAFETY AND THE LAW

Objectives

This course will enable the students to know about history of safety legislation, factories act, employees welfare, other important legislations, OHSAS, environment related acts & CPCB. He is also made aware of risk, hazards, accidents and illnesses related to common day to day, industrial activities and jobs and ways to prevent / protect themselves from such situations. It also highlights man commitment to environmental well – being.

Unit–I: History of Safety Legislation

Introduction to National Safety Council (NSC); Introduction to ILO Convention and Recommendations in providing safety; health and welfare of workers.

Unit–II: Factories Act – 1948

Factories Act, Chapter – III-Health provisions, Chapter-IV-Safety Provisions, & Chapter-V-Welfare Provisions according to amendment; Case laws and the factories act.

Unit–III: Employees Welfare

Workmen Compensation Act and Rules; ESI Act and Rules; Contract Labour Act; Employer’s Liability Act; Common Law and Product Safety

Unit–IV: Other important legislations & OHSAS

Electricity Act; Indian Explosive Act; Gas Cylinders; Petroleum Act; Statutory provision on Building and other construction works;

Unit–V: Environment related Acts & CPCB

Environmental Protection Act; The Water (control of pollution) Act; The Air (Control of Pollution) Act; Noise Pollution Act; Chemical Accidents (Emergency Preparedness, planning and response).

Reference

- 1 Techniques of Safety Management-Mc Graw Hill by D.Peterson
- 2 Pressure Vessels for Industry – Mc Graw Hill by Larry M.Soring

COURSE 1.7 : FIRE ENGINEERING

Objectives

On completion of the course, the student is expected to be familiar with the techniques of safe guarding the men and machinery in industries both from injury/ accident and fire risk. He is also made aware of risk, hazards, accidents and illnesses related to common day to day, industrial activities and jobs and ways to prevent / protect themselves from such situations. It also highlights man commitment to environmental well – being.

Unit–I : Fundamentals of Fire Engineering

Chemistry of Combustion; Basic Fire Fighting Techniques, Types of Fires & Extinguishing Methods, Fire Prevention Methodology, First Aid for Burns

Unit–II : Usage of Basic Fire Fighting Appliances

Fire Extinguishers (Portable) – Types and suitability, Fire Hose and Hose Fittings – types and thereof, Fire Pumps and Primers, Personal Protective Equipments

Unit–III : Fixed Fire Fighting Installations

Fire Hydrant System, Tank cooling/ sprinkler system, powers, Fire Alarm System, Fire Detectors, smoke detectors and Flame Detectors

Unit–IV : Major Fire Fighting Systems and special installations

Fire Crash Tender, Foam and Foam making Equipment, IC Engines, and Rescue & Escape System, Station Administration

Unit–V : Specific Risks

Building Construction/Fundamentals of Civil Engineering, Air Craft and Ship Fire Fighting, Storage, Handling & Transportation of Flammable Explosive Materials, Electrical & Chemical Fires & their Prevention, National & International Codes on Fire.

Reference Books

- 1 Fire Protection Hand Book – Publication: National Fire Protection Association USA Author: Quincy – Massachusetts

- 2 Fire and explosion Hazards Handbook of Industrial Chemicals
Publication: Jaico Publishing House Author: Tatyana A. Devletshina &
Nicholas P. Cheremisinoff, Ph. D.
- 3 Electrical Safety, Fire Safety Engineering and Safety Management –
Rao. S
- 4 Industrial Fire Protection Hand Book – Publication: CRC Press, Boca
Raton, FL. Author: Schroll, R. C, 2002.

COURSE 1.8 : SAFETY IN CONSTRUCTION INDUSTRY

Objectives

This course will enable the students to know about plant layout and excavation, work at height, hot works and erection, confined space and transportation safety. Every construction company is in huge recruitment of the people who are aware of all the mentioned.

Unit-I

Introduction to Construction Safety, Excavation – types, hazards involved safety measures, check lists, piling, and concreting, safe means of access.

Unit-II

Introduction to Fabrication yard – hot works hazards associated and safe measures for the following jobs (welding, drilling, grinding, gas cutting and sand blasting).

Unit-III

Introduction to work at height – Advantages and disadvantages, scaffold erection – types, hazards involved, safe measures whole working, ladder construction – types, hazards involved, safe measures.

Unit–IV

Introduction material handling – manual handling - hazards associated, safe measures, mechanical handling – hazards associated, safe measures, equipments used (Ropes, chains, hooks, crane and fork lifts etc.)

Unit–V

Introduction to Tools – Hand Tools – Risks associated, safe practices, Power Tools – Risks associated safe practices, care and maintenance, prerequisites.

Reference Books

- 1 Hand Book of Construction Safety Practices, Bureau of Indian Standards, New Delhi, 2001.
- 2 Construction Safety – Publication: Prentice Hall- Author: Jimmie Hinze, 1997.
- 3 ABC of Industrial Safety Remember ABC Publication: MEEDS Author: V P M Mani.
- 4 Electrical Safety, Fire Safety Engineering and Safety Management– Rao.S

Objectives

This course will enable the students to know about safety education and training, employee participation, auditing, safety committee, safety promotion and publicity, cost controlling and emergency planning. He is also aware of promoting the same in the industry to come day to day.

Unit-I

Introduction to Management and Management Principles, Safety Management Role – Managerial Responsibilities, Principle of Management.

Unit-II

Planning for safety, purpose, procedure, variety forms of plans, safety policy, planning for process implementation, communication importance.

Unit-III

Organizing for safety – Nature and principles organization structure of safety, role of safety officer, functions in safety department, leadership methods.

Unit-IV

Motivation to the employees – importance, safety education and training- training methods, assessment or evaluation of training programs.

Unit-V

Safety committee-structure and functions, Auditing – types, procedures, key elements of audit, emergency planning – types and importance.

Reference Books

- 1) Industrial safety health and environmental management system publication: khanna publishers, authors: r.k jain and sunil s. Rao
- 2) Industrial safety management publication: tata mc graw-hill publishing company ltd. Author: I. M. Deshmukh
- 3) Abc of industrial safety remember abc publication: meeds author: v p m mani.
- 4) Industrial accident prevention – publication: mc graw-hill – author: herbert william heinrich.

COURSE 2.2 : SAFETY ENGINEERING

Objectives

This course will enable the students to know about fire and explosion, material handling and mechanical handling, industrial lighting, ventilation, heat control, noise and vibration which will be look after in every industry. The student is also aware of promoting the same in the industry to come day to day.

Unit-I

Plant Layout and Design, Safety and Good House Keeping – 5S House Keeping Improve method, important standards and codes practice for plant and equipment, Road safety.

Unit-II

Introduction to Safe Guarding Machinery, Principles of machine guarding; Ergonomics of machine guarding; Type of guards; Work place design; improving safety and productivity through work place design;

Unit-III

Purpose of lighting, advantages of good illumination, lighting and safety; lighting and the work; sources and types; principles of good illumination; minimum standards of illumination; design, maintenance of lighting.

Unit-IV: Ventilation & Heat Control

Purpose, thermal environment and its measurement; physiology of heat regulations; indices of heat stress; control of heat exposures; control at source; insulation; local exhaust ventilation; control of radiant heat; dilution ventilation.

Unit-V

Effects of noise on man; measurement and evaluation of noise; vibration damping, isolation, absorption, silencers, case studies; Chemical Safety-Hazards/Risks, Safety measures, Confined Space – Hazards/Risks, Safety measures

Reference

- 1 Principle of exhaust ventilation by HMSO

- 2 Introduction Ergonomics, WHO by Singleton
- 3 Industrial Safety hand Book, Mc Graw Hill by Handley

COURSE 2.3 : APPRIASAL, ANALYSIS, INSPECTION & CONTROL PROCEDURES

Objectives

This course will enable the students to know about plant and equipment safety appraisal technique, hazard identification techniques, accident investigation, reporting and analysis, measurement and control of performance, first aid. He is also aware of promoting the same in the industry to come day to day.

Unit–I : Plant & Equipment safety appraisal technique

Objectives, Plant Safety observations; inspections; safety sampling; safety surveys; job safety analysis safety inventory system, work permit systems, loss control; damage control & system safety.

Unit–II : Hazard identification techniques

Hazard Analysis; inductive and deductive; Fault Tree Analysis; Risk Analysis Techniques; Introduction to HAZOP, Safety Audit, Evaluation risks in chemical process.

Unit–III : Accident Investigation, reporting and analysis

Purpose, identifying the key factors and the causes, writing reports and report forms; corrective action; purpose of investigation, principles of investigations.

Unit–IV : Measurement & control of performance

Lost Time Accident; Disabling injury; Accidents reportable under the Factories Act; Frequency Rate; Severity Rate; Incidence rate and man days lost; temporary, permanent, partial and total disablement; time charges schedules in Workmen's compensation Act and the Indian Standards.

Unit–V : First Aid

Definition; principles; Training in First Aid; General Rules; call for assistance; provide urgent care; examine the victim; events requiring for first aid; types and uses of artificial respiration; external cardiac massage;

choking; fainting; poisoning; open wounds; puncture; depression shock; heart attack.

Reference

- 1 Hazard Operability Studies – An Introduction- The guide work approach by National Safety Council, India.
- 2 Guidelines for hazard Evolution Procedures by American Institute of Chemical Engineer, New York, USA.

COURSE 2.4 : INDUSTRIAL HYGIENE & OCCUPATIONAL HEALTH

Objectives

This course will enable the students to know about introduction, industrial hygiene, physical hazards, and chemical hazards, dust related,

work physiology, prevention measures where the safety officer maintains and follows.

Unit-I

Introduction to Occupational Health, Fundamentals Of Occupational Health, Need For Occupational Health & Monitoring, Tip To Improve Occupational Health

Unit-II

Importance of industrial hygiene and good house keeping, ergonomics – study, community health, yoga for health and stress free life. Introduction to osha 18001.

Unit-III

Occupational related common diseases arise at work site, diseases due to physical hazards, chemical hazards, biological etc. Diseases arising from dust and its control measures.

Unit-IV

Legal aspects to control occupation related diseases, medical surveillance and facilities to control diseases, engineering aspects to control occupation related diseases, compensation and rehabilitation.

Unit-V

Work Physiology – Work capacity and man job alignment; Fatigue and rest allowances; Fitness criteria for work diet; psychological effects on human being and its treatment.

Reference Books

- 1 Industrial Safety Health and Environmental Management system
Publication: Khanna Publishers Authors: R.K Jain and Sunil S. Rao.
- 2 Safety, Security and Risk Management – Singh U. K.
- 3 Electrical Safety, Fire Safety Engineering and Safety Management –
Rao. S.

COURSE 2.5 : ENVIRONMENTAL EDUCATION

Objectives

On completion of the course, the student is expected to be familiar with occupation related illnesses / hazards and preventive / control measures there of. He is also made aware of risk, hazards, accidents and illnesses related to common day to day, industrial activities and jobs and ways to prevent / protect themselves from such situations. It also highlights man commitment to environmental well – being.

Unit–I

Importance of environment conservation, effect of pollution on man and environment - concept and scope of environmental chemistry, natural cycles of environment hydrological, oxygen, nitrogen, phosphorous, carbon and sulphur cycles.

Unit–II

Formation of Ozone in the Stratosphere –Causes Of Environmental Degradation And Control Actions Recommended, Solid Waste Management & Disposal Methods – Sources, Classification of Solid Wastes – Methods of Collection.

Unit–III

Water Pollution – Classification of Water Pollutants – Characteristics Of Waste Water – Treatment Methods – Sedimentation, Coagulation, Equalization, Neutralization, Aerobic And Anaerobic Processes – Evaporation, Ion Exchange, Chemical Precipitation And Electro Dialysis.

Unit–IV

Air pollution – classification of air pollutants - climate change, acid rain, photo-chemical smog and global warming - air pollution control methods and equipments source correction method, cleaning and removal of gaseous effluents.

Unit–V

Wild life conservation, deforestation & land degradation, legal aspects of pollutions – laws. – Public health aspects. Noise and vibration effects on human and control measures.

Reference Books

- 1 Industrial safety health and environmental management system publication: khanna publishers authors: r.k jain and sunil s. Rao.
- 2 Abc of industrial safety remember abc publication: meeds author: v p m mani.
- 3 Industrial safety and pollution control handbook – Nagaraj. J.
- 4 Environmental pollution control engineering, author: c s rao, wiley eastern Ltd.

COURSE 2.6 : PRODUCTION & MATERIALS MANAGEMENT

Objectives

The key objective of this course is to acquaint students with the needed skills and knowledge for making effective and efficient purchase, Decision storage and flow of materials in manufacturing and service organizations; Cost-reduction techniques in Pre-Purchase and Post-Purchase systems.

Unit–I : Production Function

Introduction - Production functions - Design of production system - Types of production - Types of process – Productivity - Ergonomics.

Plant Location - Factors influencing plant location – Multi Plant location - Foreign Location – Relocation – Plant location trends.

Unit–II : Plant Layout and Maintenance

Plant Layout - Types of layouts - Process layout - Product layout - Layout of service facilities - Office layout - Use of service facilities - Use of drawings, templates and models in layout physical facilities.

Maintenance - Objective of maintenance – Elements of maintenance - Types of maintenance - Breakdown time - Distribution time - Preventive maintenance Vs Breakdown maintenance - Optimum crew size - Maintenance records.

Unit–III : Production Planning and Control

Production Planning and Control - Routing – scheduling – Despatching – Expediting - GANTT charts - Work study and Motion study and Method study analysis – Use of Computers in PPC – Design and Implementation of PPC System.

Unit–IV : Materials Management

Materials Management - Objective of materials management - Materials forecasting and planning - Inventory control - Fixed order size , P&Q Inventory System - Deterministic probabilistic models, Static inventory models - Spare parts management - Materials requirement planning - Aggregate inventory management - Implementation aspects of inventory systems.

Unit–V : Store and Purchase Function

Standardization, simplification, codification, stores layout, storage systems and equipment, stores preservation, stores procedures- and automation of warehouses.

Purchasing function - Purchasing policies and procedures, legal aspects of purchasing, tax considerations in purchasing, selections and sources of supply, make or buy decisions - Vendor evaluation and rating – vendor development

Unit–VI : Materials Management Information System

Materials accounting and budgeting evaluation of materials management performance. Information systems and computers in materials management.- Materials handling equipments – Stores Account – Price - Cost analysis and Negotiation forward buying - Speculation and Commodity markets - Capital equipment buying, imports and customs – Clearance - Purchasing research.

Text Books

- 1 Buffa E.S: Modern Production Management, Engle Wood Cliff, New Jersey, Wiley, 1993.
- 2 Dutta A.K.: Integrated Materials Management, New Delhi, PHI Learning, 2000.
- 3 Nair. N.K. Purchasing and materials management, Vikas Publishing house, New Delhi, 2005.
- 4 Shridhara Bhat. K. Production and Materials Management, Himalaya Publishing house, Mumbai, 2003.
- 5 Khanna, O.P. Industrial Engineering and Management, Dhanpat Rai & Sons, New Delhi, 2006.

Reference Books

- 1 Adam. EE & Ebert. R: Production and Operations Management. New Delhi, PHI Learning, 6th ed., 1995.
- 2 Amrine Harold T. etc.: Manufacturing Organization and Management, Engle Wood cliffs, New Jersey, PHI Learning, 1993.
- 3 Chary S.N.: Production and Operations Management, New Delhi, Tata McGraw Hill, 1999.
- 4 Gopalakrishnan Sundaresan, Materials Management, New Delhi, PHI Learning, 2003.
- 5 Paneer Selvam, R. Production and Operations Management, PHI Learning, 2007.
- 6 Richard B Chase. Operations Management for Competitive Advantage, TATA McGraw Hill, 11th edition, New Delhi, 2007.

COURSE 2.7 : OPTIONAL PAPERS

2.7.1. SAFETY IN CHEMICAL INDUSTRY

Objectives

This course will enable to understand the properties and hazards of chemicals, hazards in various unit operations and in the industries like petrochemicals, fertilizers, pesticides, Chlor-alkali, etc. Safety in handling, storage, transportation and processing of chemicals, Instrumentation for safe operation of plants, prevention and control of fire and explosion.

Unit-I

Safety in Chemical industry, Instrumentation for safe plant operations, Hazard in Unit Processes & Operations: Control Measures, specific safety measures for chemical industries like Fertilizer, Explosives and Polymer plants.

Unit-II

storing and handling; Chemicals Compatibility Considerations; Transportation of Chemicals; Safety Precautions for transporting hazardous / toxic / flammable / explosive/ radio-active substance. Transfer of chemicals by pipelines within and outside installations.

Unit-III

Color coding identification of contents; Safety Precautions for working on pipelines; Safe procedures of start up and shut down procedures; Safety in preventive and emergency maintenance operations; Use of Material Safety Data Sheets.

Unit-IV

Assessment of fire explosion and toxicity index, Dow & Mond, dispersion, Probability analysis and modeling; Pressure vessels fired and unfired, codes of practices governing their safety; Assessment of vessels and test checks

Unit-V

Inspection techniques for plants, reaction vessels, check list for routine inspection, checklist for specific maintenance; corrosion and erosion, location, causes inspection and prevention.

Reference

- 1 Chemical Reaction Hazards – A guide to Safety by John Barton.
- 2 The Chemical Industry – Mc Graw Hill by C.A. Heaton.
- 3 Fire and Explosion Hazards Handbook of Industrial Chemicals – Noyes Publications by Tatyana A. Daveletshina.

2.7.2. SAFETY IN ELECTRICAL INDUSTRY**Objectives**

This course will enable to understand the electrical hazards, first aid, lighting, safety in operation and maintenance of steel structural shop operations, machine shop etc. He is also made aware of risk, hazards, accidents in electrical industry related to common day to day, industrial activities and jobs and ways to prevent / protect themselves from such situations. It also highlights man commitment to environmental well – being.

Unit-I

Introduction to electricity, how electrical fires start, danger sign for some wiring, cables, safety valve, how electricity can shock you? First Aid, some precautions to avoid electrical accidents.

Unit-II

Dangers from electricity – safe limits of amperages, voltages – safe distance from lines – capacity and protection of conductors – joints and connections – means of cutting off power – Overload and short circuit protection.

Unit-III

Selection of materials, Lighting, unavoidable electrical heat, and Thermal power plants – safety measures in thermal power plants, turbine, generator, hydrogen plant, transformer yard, cable galleries, fire station, fire extinguishers, first aid and medical facilities, conclusion.

Unit-IV

Static electricity and electricity in mention, how electricity causes Injury, Know basic first aid in case of electrical emergency, some don'ts with electricity, Prevent electrical fires, three main causes of fire in industry, Electrical wiring and handling of electrical equipment

Unit-V

Earth fault protection, Earth, insulation and continuity tests – Protection against over voltage – hazards arising out of “borrowed” neutrals precautions – Portable electrical apparatus – Flame proof – Electrical equipment – precautions in their selection

Reference

1 Electrical safety: a guide to the causes and prevention of electrical (HardCover - 1994) by J. Maxwell Adams.

2 Electrical Safety Handbook (Hardcover - 2005/09/30) by John Cadick (Author), Mary Capelli-Schellpfeffer (Author), Dennis K. Neitzel (Author).

3 National Electrical Safety Code Handbook: A Discussion Of The Grounding Rules, General Rules, And Parts 1, 2, 3, And 4 Of The 3rd (Paperback - 1996) by Clapp.

