

# **SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)**



## **SYLLABUS**

For

### **DIPLOMA IN FIRE SAFETY & HAZARD MANAGEMENT** Course Code: DFSHM

Department of Fire Safety & Disaster Management

|                    |   |             |
|--------------------|---|-------------|
| Duration of Course | : | 1 Year      |
| Examination Mode   | : | Yearly      |
| Examination System | : | Non-Grading |

Swami Vivekanand University, Sironja Sagar (M.P.)  
2015-2016



## DIPLOMA IN FIRE SAFETY & HAZARD MANAGEMENT

Duration of Course (1 Year)

Faculty :Science

Department : Fire Safety & Disaster Management

Scheme of Course : Course Code-DFSHM

Semester / Year -Yearly

| Course Code        | Title of the Paper  | Distribution Of Marks |     |            |     |            |                |
|--------------------|---|-----------------------|-----|------------|-----|------------|----------------|
|                    |   | Theory                |     | Practical  |     | Total      | Marks Obtained |
|                    |   | Max                   | Min | Max        | Min |            |                |
| DFSHM-101          | FUNDAMENTALS OF FIRE SCIENCE                                      | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -102         | FIRE CONTROL TECHNOLOGY   | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -103         | PRINCIPLES OF INDUSTRIAL SAFETY AND ACCIDENT PREVENTION           | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -104         | LEADERSHIP AND COMMUNICATION                                      | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -105         | RISK MANAGEMENT AND HAZARD CONTROL SYSTEM                         | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -106         | HEALTH, SAFETY, ENVIRONMENTAL ENGINEERING AND CONSTRUCTION SAFETY | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -107         | DISASTER MANAGEMENT, EMERGENCY PLANING & FIRST AID                | 100                   | 33  | -          | -   | 100        |                |
| DFSHM -108         | PRACTICAL   | -                     | -   | 100        | 33  | 100        |                |
| <b>Grand Total</b> |   | <b>700</b>            |     | <b>100</b> |     | <b>800</b> |                |



**FUNDAMENTAL OF FIRE SCIENCE**  
**Course Code : DFSHM(101)**

**UNIT- I**

**Marks: 20**

History of fire service , Force, resultant force , Mass and weight, work, power, energy , Law of conservation of energy , Mechanics – rest and motion , Distance and displacement , Speed and velocity.

**UNIT- II**

**Marks: 20**

Acceleration, retardation, Acceleration due to gravity, Machines and engines, Efficiency, Friction, Atomic structure, Elements, compounds.

**UNIT- III**

**Marks: 20**

Pure substance and mixture, Physical and chemical changes, Energy changes, Temperature, Heat of decomposing, Chemical reaction, Investigation of fire, Arson and detection of fires.

**UNIT- IV**

**Marks: 20**

Classification of fire , General Causes of fire , Detection of fire, Extinguishing methods, First aid fire fighting equipments, Fire bucket, Fire beater, hose reel hose, Portable extinguisher, Construction, Operation ,Maintenance, refilling.

**UNIT- V**

**Marks: 20**

Fixed fire fighting installations using water, Hydrant or fire water system, Classification of hydrant system, Sprinkling system, Special fires and fire fighting, fixed fire fighting installations not using water, Complete CO<sub>2</sub> flooding system, Complete DCP spraying system, Complete Halon flooding system.

**Text Books**

1. Carl Goodson, “Essentials of fire fighting” Fire protection publications; 5th edition
2. Pann Well, “Fire engineering’s skill drills for Fire Fighter”, Pann Well; 1st & 2<sup>nd</sup> edition.



**FIRE CONTROL TECHNOLOGY**  
**Course Code : DFSHM (102)**

**UNIT- I**

**Marks: 20**

Hose, Causes and prevention of shock, Causes and prevention of rubber acid, Couplings, Component parts of inter locking couplings, Suction coupling wrenches, Branches, nozzles and branch holders, Breechings, Adapters.

**UNIT- II**

**Marks: 20**

Trouble shooting and maintenance, Rope, Lines, knots and ladders, Cordage, Different type of knots, Purpose of knot, Ladders.

**UNIT- III**

**Marks: 20**

Introduction, Hook ladder, escape ladder, turn table and extension ladder, SCBA and foam making equipments, Introduction, Physiology of respiration.

**UNIT- IV**

**Marks: 20**

Effects of respiration, Essential fetchers of BA set, Description and technical details, Care and maintenance various BA sets, Foam & foam making equipments, Pumps, primers, tenders and water relays, Working principle of various pumps primers, Water relay system, Open & Closed circuit system, Operation and maintenance of various tenders, Water, foam, Co<sub>2</sub>, DCP and emergency tenders.

**Text Books**

1. Carl Goodson, "Essentials of fire fighting" Fire protection publications; 5th edition
2. Pann Well, "Fire engineering's skill drills for Fire Fighter", Pann Well; 1st & 2<sup>nd</sup> edition.



**PRINCIPLES OF INDUSTRIAL SAFETY AND  
ACCIDENT PREVENTION  
Course Code : DFSHM (103)**

**UNIT- I**

**Marks: 20**

Introduction to Safety, Goals, Importance, Need, History of Safety, Accident Causation, Theories and principles of accident Causation, The effect of accident, Unsafe Act & Unsafe condition, Unpredictable performance, Consequences of accident.

**UNIT- II**

**Marks: 20**

Cost analysis and Accident Prevention, Direct & Indirect accident, Accident Prevention Methods, Accident Investigation & Reporting Pre- accident Strategy and Health Policy Physical hazards, Chemical hazards & Mechanical hazards, Housekeeping and Importance.

**UNIT- III**

**Marks: 20**

Role of government, Management, workers and trade unions, Management of shock, Burns, scalds and accidents caused by electricity, Rescue and transport of casualty Monitoring of Safety Performance Petroleum Refineries.

**UNIT- IV**

**Marks: 20**

Electrical Safety, over load and short circuit protection, Earth fault protection, Classification of Petroleum Products, Safety Inspections.

**UNIT- V**

**Marks: 20**

Workshop Safety, Welding and gas cutting safety, Hazard Evaluation Techniques, Event tree analysis, Failure modes and effects analysis, Relative ranking techniques.

**Text Books**

1. Fundamentals of Industrial safety & health by K.U. Mistry.
2. Factories Act 1948



**LEADERSHIP & COMMUNICATION**  
**Course Code : DFSHM (104)**

**UNIT- I**

**Marks: 20**

Definition of leadership, Organization, Elements & Principles of good organization, Communication, Methods of Communication, Speaking skills, written communication, Formal and Informal reports.

**UNIT- II**

**Marks: 20**

Safety communication, Managerial communication, Communication with employees with conducting training, Emergency communication, Essentials of Grammar.

**UNIT- III**

**Marks: 20**

Parts of Speech, Types of Correspondence, Receipt and Dispatch of Mail, Types of Letters–Formal / Informal, Importance and Function.

**UNIT- IV**

**Marks: 20**

Group Discussion & Presentation, Presentation Skills, Voice & Picture Integration, Body Language, Presentation Plan.

**UNIT- V**

**Marks: 20**

Employers Expectations, General Etiquette, Dressing Sense, Postures & Gestures.

**Text Books**

1. Abraham Benjamin Samuel Practical Communication Communicative English LSRW2000 SRMEC–June 2006 Revised Edition.
2. Staff of the Department of Humanities and Social Science, Anna University, “English for Engineers/Technologist Vol.-I”. Orient Longman, 1990.



**RISK MANAGEMENT AND HAZARD  
CONTROL SYSTEM  
Course Code : DFSHM (105)**

**UNIT- I**

**Marks: 20**

Hazards Definition, Risk Management, Hazards Control System, Fault tree Analysis, Failure mode and effect Analysis, Physical and chemical properties of hazardous materials, Major industrial hazards.

**UNIT- II**

**Marks: 20**

Types and consequences of major industrial hazard, Effects on human body, Stages of combustion, Hazards of combustion, Stability and inflammability, Petrochemicals and other hydrocarbons, Tank fire – storage tank, trucks, service stations, High pressure pipe lines.

**UNIT- III**

**Marks: 20**

Pressurized and liquefied gases, Natural gas & Petroleum gases, Refrigerants etc., Corrosiveness, Radioactive hazards.

**UNIT- IV**

**Marks: 20**

Special precaution for handling, Emergency preparedness, Pesticides, Explosion.

**UNIT- V**

**Marks: 20**

Deflagration and detonation of gas, Dust explosion, Confined and unconfined vapor cloud explosion, Safety Management and legislation, Functions of safety management, Factories Act 1948 (chapter 3, 4, 5), Workmen compensation Act 1923 (objectives and coverage's).

**Text Books -**

1. AIChE/CCPS, Guidelines for Hazard Evaluation Procedures second edition. Centre for Chemical Process Safety, American Institute of Chemical Engineers, New York, 1992.

2. AIChE/CCPS, Guide lines for Chemical Process Quantitative Risk Analysis second edition. Centre for Chemical Process Safety, American Institute of Chemical Engineers, New York, 2000.

3. Lees F.P. Loss Prevention in the Process Industries second edition. Butterworth's, London, 1996



**HEALTH, SAFETY, ENVIRONMENTAL  
ENGINEERING AND CONSTRUCTION SAFETY  
Course Code : DFSHM (106)**

**UNIT- I**

**Marks: 20**

Occupational Health Hazards ,OSHA, Principles of Environmental Engineering, Pollution Prevention, Waste treatment, Disposal of waste.

**UNIT- II**

**Marks: 20**

Standards of Environmental Management System, Engineering Control Health Hazards, Material handling safety, Personal protective Equipments, Electrical Hazards and safety, Introduction of construction industry, Construction Safety Organization, Work permit system, Safety at work.

**UNIT-III**

**Marks: 20**

Safety at construction site ,Hazards, Scaffolding and working platform ,Welding and cutting, Rigging and hoisting, Handling and storage of compressed gas, Transportation of men and material ,Lock out and tag out, Building construction, TAC and NBC rules, Inspection of site, high rise building.

**UNIT- IV**

**Marks: 20**

Fire protection introduction to TAC norms, Lightning and electrical hazard protection, Plan reading and method, Standard, symbols, designation, Personal hazards, Fire escape structural precaution.

**UNIT- V**

**Marks: 20**

Safe Work Place, Basic requirements of Scaffolding, Erection of Scaffolding ,Scaffolding Safety ,Ladders, Permit To Work System (PTW),Responsibilities relating with PTW,HSE Training ,Personal Protective Equipment (PPE),HSE Training.

**Text Books**

1. C.S.Rao: Environmental Pollution Control Engineering, New Age International(P)Ltd Publishers,1991.
- 2.Fundamentals of Industrial safety & health by K.U. Mistry.
3. V.J. Davies and K.Tomasin, Construction Safety Handbook.
4. R.T. Ratay, Hand book of Temporary Structures in Construction.
5. National Building Code of India





# **DISASTER MANAGEMENT, EMERGENCY PLANING & FIRST AID**

**Course Code : DFSHM (107)**

## **UNIT- I**

**Marks: 20**

Introduction & Classification of Disasters, Inter-relationship between Disasters and Development, Disaster Risk Management in India, Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management.

## **UNIT- II**

**Marks: 20**

On site Emergency Planning, Emergency Alarm System ,Emergency Control Room ,Key personnel ,Emergency Control Program, Off site Emergency Planning ,Mutual Aid Scheme, Emergency Evacuation, Security and Media management.

## **UNIT-III**

**Marks: 20**

Hazard Communication, Material Safety Data Sheet (MSDS), Use of hazardous and toxic substance, Storage and Handling, First Aid, Introduction.

## **UNIT- IV**

**Marks: 20**

Action at Emergency, The practice of First Aid, Principles of First Aid, Training in First Aid, General rules of First Aid, Shocks.

## **UNIT- V**

**Marks: 20**

Control of bleeding, Burns and Scalds, Heart Attack, Resuscitation, Disorder of Circulation, Dressing & Bandages, Handling & transport of injured, Emergency First Aid.

## **Text Books-**

1. ILO, Geneva: Major Hazard Control - a Practical Manual.
2. UNEP, Paris: APELL - A Process for responding to technological accidents, A Handbook, Industry & Environment Office. 1998
3. Accident Prevention Manual for Business and Industry, Vol. I - National Safety Council, USA.
4. Oils spill Response : The National Contingency Plan - Institute of Petroleum, London
5. Petak, W.J and At kisson, A.A.: Natural Hazard Risk Assessment and Public Policy : Anticipating the Unexpected
6. U.R.Rao: Space Technology for Sustainable Development



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## **Practical**

**Course Code: DFSHM (108)**

- Fire protection introduction, Ladders, Hose