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

SYLLABUS

For

DIPLOMA IN INDUSTRIAL SAFETY

Course Code: DIS

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

Swami Vivekanand University, Sagar(M.P.)

DIPLOMA IN INDUSTRIAL SAFETY

Faculty :Science
Session: 2015-16
Course Code: DIS

Department :Fire Safety & Disaster Management

Duration of Course :1 Year

Course Code	Title of the Paper	Distribution Of Marks					
		Theory		Practical		Total	Marks Obtained
		Max	Min	Max	Min		
DIS-101	FIRE SERVICE EQUIPMENT AND APPLIANCES	100	36	-	-	100	
DIS -102	SECURITY MANAGEMENT	100	36	-	-	100	
DIS -103	SECURITY ACTS AND LAWS	100	36	-	-	100	
DIS -104	INDUSTRIAL SAFETY MANAGEMENT	100	36	-	-	100	
DIS -105	INDUSTRIAL SAFETY ACTS & LAWS	100	36	-	-	100	
DIS -106	PROJECT WORKS	100	36	-	-	100	
DIS -107	PRACTICAL – I FIRE FIGHTING DRILLS	-	-	100	36	100	
DIS -108	PRACTICAL – II FIRE SERVICE EQUIPMENT	-	-	100	36	100	
Grand Total		**600**		**200**		**800**	

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Fire Service Equipment And Appliances
Course Code :DIS (101)

UNIT- I

Extinguishers & Hose **Marks: 20**

Study of various types of fire fighting extinguishers**,** Study of IS specifications - Water type, foam, CO_2, DCP, HALON**,** Testing of extinguishers, Inspection and maintenance**.** Introduction-General characteristics of delivery and suction hose, Study of I.S. specification on control percolating hose, Rubber lined or re-enforced fabric lined woven jacket hose and unlined hose, Care and maintenance of suction and delivery hose and their testing.

UNIT- II

Fittings & Ropes **Marks: 20**

Description, use & maintenance of Couplings, Adapters, Branches, Nozzles, breeching, Collecting head, Ramps, Special type of branch and nozzles, Branch holders, and Radial branches, Monitor- portable and fixed ,Study of Indian standard specification of fittings. Material used, Construction, Types and testing of ropes, 4.4causes of deterioration, Terminology used in fire service, Synthetic fibers and steel wire ropes.

UNIT- III

B.A. Set & Foam **Marks: 20**

Types of set. Atmospheric and self contained, Theory of respiration**,** Essential features of B.A. sets, various parts of B.A. set and their function, Sequence of wearing. Operational use. Recharging, testing, maintenance, advantages and disadvantages of different sets, Liquid air set, Working duration and principle of calculating working duration, Donning, Pre entry tests, Low and high pressure tests, working in hot and humid atmosphere, Study of associated equipments.

Types of foam, Characteristics of fire fighting foam and its storage, Foam equipment- round the pump proportioned, inline inductor, pick up tube, foam making branches, Knap sack tank, multiple jet inductor, and their function, operational use,Mechanical foam generator, foam making pumps, foam maker,variable inductor, high expansion foam generator.

UNIT- IV

Small Gears & Hydrant **Marks: 20**

Introduction to small gears, lighting equipments and other tools used in fire service, its use, care and maintenance ,Special gears- Study of hydraulic rescue equipments, cutting gears and other rescue apparatus, Lifting equipments- Mechanical, hydraulic, pneumatic jacks, pulley and blocks, air bags ,Electric power tools and oxy-propane cutting set, protective clothing's, blower and exhauster ,Study of Indian specification of Fireman Axe and Fire hook, Demonstration of various special and small gears.

Types of hydrants, Standard of fire hydrants, Description of Sluice valve, Pillar, Screw down type hydrant, Hydrant gears, operation, inspection and testing. 8.5 Water mains, water hammer, hydrant spacing, pressure flow test, outfit and its description, Study of Indian standard specification for stand pipe and sluice valve hydrant, Code of practice for installation of hydrants

UNIT- V

Ladder & Appliances **Marks: 20**

Development of ladders, Important provisions from I.S.S. of extension ladder, Constructional features of various types, their parts, operational use, care and maintenance, standard and acceptance tests, Turn table ladder and Hydraulic platform: - Terminology, construction, their function, safety devices, sitting of appliances, operational use, standard tests and maintenance.

Construction and layout of fire fighting vehicles and appliances .Basic knowledge of appliances with reference to IS specification like : Hose Laying Lorry, Foam and Crash Tender, Dry Powder Tender, Emergency Tender, Mobile Control Van, Break down Van, Water Tender Type A, B, and X, Fire Boats, Trailer pump, Portable pump, Carbon dioxide Tender.

Text Books

1. Manual of Foremanship Part-II (HMSO)
2. Manual of Foremanship Book-V (HMSO)
3. Fire Fighting Vehicles: 1840-1950
4. Fire and Crash Vehicles from 1950
5. Fire Fighting Apparatus and Procedures by Erven.
6. Fire Company Apparatus & Procedures by Erven.
7. IS 948, 950, 6067, 951, 942, 943, 944

Swami Vivekanand University, Sagar (M.P.)

Security Management
Course Code :DIS (102)

UNIT- I **Marks: 20**

Safety Audit Statutory requirement Internal, External Economics of Safety

Cost of accidents: Financial costs to individual and family organization, society completion procedure, utility and limitations of cost data, budgeting for safety**,** Management Information System for safety : Sources of information on safety, health and accidents, compilation and collation of information, analysis and use of modern methods of programming, storing and retrieval of MIS for safety health and environment.

UNIT- II **Marks: 20**

Types of Security

Personal Security, Security of personnel – Subversion-Subversive, Security of information, Security of material – Sabotage – Saboteur their plan and action, Physical and Non-Physical Security.

UNIT- III **Marks: 20**

Industrial Security

Factory internal and external security, Inflammable tankers/trucks checking procedure, materials/goods- Inward and outward, patrolling duty, communication and liaison with concerned departments, housekeeping check, Industrial safety procedure, work permit system, Unsafe act and unsafe conditions, Industrial Accidents, Disaster Management, Responsibility in case of Emergencies (Fire, Explosion, Toxic or Poison gas release), Emergency plan and mock drill, Chemical material safety ,data sheet, Security arrangement for Factory VIP visits.
Strike & Labor unrest, self protection, maintenance of documents, use of modern electronic devices for bugging and debugging, Building Security, Campus Security, Security of Vulnerable Area/Vulnerable Point (VA/VPs), Security of Installations, Security of VIP/ VIPs, Security of Operation, Office Security

UNIT- IV **Marks: 20**

First Aid

First aid and Ambulance aid. Fire incidents and range of casualties, Wounds and it's First aid, Bleeding and it's First aid. Shock and it's ,First aid, Burns & its First aid, Unconsciousness, Heat and cold injuries and its First aid ,Fracture , Joints injuries , and First aid Snake bite, Insect bite, Dog bite, and its first aid ,Chemical disaster and casualty service.

UNIT- IV **Marks: 20**

Respiratory System

Respiratory system and artificial respiration, Stretcher and casualty handling, Triangular Bandages and their uses, roller bandage, and its use, Rescue drill: Picking up, lowering and carrying insensible persons, Lines rescue, Resuscitation, Vital function – Different methods of manual resuscitation, their advantages and disadvantages.

Text Books

1. Factory Act 1948.
2. Security Management and Services.
3. First Aid to the Injured by St. John Ambulance Association.
4. Hand Book of Industrial Fire Protection and Security.
5. Code of Practice for Hazardous Goods by NFPA.
6. Hand Book of Fire Protection by NFPA.

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Security Acts & Laws
Course Code :DIS (103)

UNIT- I **Marks: 20**

Crime

Types of Crime, Crime investigation, Investigator's quality, Interrogation, Scientific Aids of Investigation, Finger Prints, Forensic Laboratory, Viscera.

UNIT- II **Marks: 20**

Identification

Identification of person, Identification Parade, Observation, Intelligence, Counter Intelligence, Investigating agencies, Espionage, Espionage net.

UNIT- III **Marks: 20**

Spies

Types of Spies, Description of persons- age, sex, weight, and height.

UNIT- IV **Marks: 20**

Scenes

Scenes of incidents-mapping, sketch, Reports, Making reports, Search, Types of search, Raids, Raid operation, Raid Commander and subordinates, Cordons, Surveillance, Vigilance.

UNIT- V **Marks: 20**

Rules, Regulations related to Security

Cr. PC, IPC 5.3 Evidence, Hearsay Evidence

Text Books -

1. Criminal Procedure Code.
2. Indian Panel Code.
3. Evidence Act.
4. Indian Official Secret Act 1923
5. Crime Investigation.

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Industrial Safety Management
Course Code :DIS (104)

UNIT- I **Marks: 20**

Introduction & Principles of Accident Prevention

Management: Concept, definition, nature and importance evolution of management thoughts and principles, Role and functions of a manager, elements of management, functions**,** Management Principles: General principles of Management, managerial role authority, responsibility and power, span of management, Delegation and decentralization of authority**,** Industrial Safety: Role of Management in Industrial Safety, Safety, Management – Principals and practices.

Definitions: Incident, accident, injury, and dangerous occurrences, unsafe acts unsafe conditions hazards (error, oversight, and mistake) near miss incident frequency and security rate, Accident: Theories/models of accident occurrences, principles of accident, prevention.

UNIT- II **Marks: 20**

Planning for safety & Organizational Behavior and Safety
Human factors contributing to accidents

Planning: Definition, purpose, nature, scope and procedure, range of planning, variety of plans, strategic planning and process of implementation, Management by objectives and its role in safety, policy formulation.

Analysis of accident data with respect to various parameters accident investigation, remedial measures, implementation of remedial measures, why analysis for accident investigation Human behavior: Individual differences, behavior as function of self and situation, perception of danger and acceptance of risks, knowledge and responsibility Vis-à-vis safety performance theories of motivation and their application of safety role of department in motivation ,Conflict and Frustration: Identification of situations leading to conflict and frustration and techniques of management.

UNIT- III **Marks: 20**

Organizing for Safety & Directing for Safety

Organizing: Definition, need, nature and principles, Organizing of Safety: Organization structure and safety department Safety Committee: Structure and functions, line and staff functions for safety.

UNIT- IV **Marks: 20**

Safety Education and Training

Training for Safety: Element of training, cycle, assessment of needs , techniques of training, design and development of training programmed, training methods and strategies (types of training, evaluation and review of training programmed).

UNIT- V **Marks: 20**

Employee Participation in Safety

Employee Participation: Purpose, areas of participation, methods role of trade union in safety and health.

Safety, Promotion and Publicity: Safety suggestion schemes, safety competitions, safety incentive scheme audiovisual publicity, and other promotional methods.

Text Books -

1. National Safety Council Hand book for accident prevention
2. National Safety Council Journal “ Chronical”
3. National Fire Prevention Association (NFPA) Industrial Hazard Manual
4. Factory Act Manual
5. Industrial Safety Audit Procedure As per BS

Swami Vivekanand University, Sagar(M.P.)

Industrial Safety Acts & Laws
Course Code :DIS (105)

UNIT- I **Marks: 20**

The Factories Act, 1948 and the Factories Rules: History of the Factories Act, Provisions under the Factories Act and Rules made there under with amendments, case laws under the Factories Act.

UNIT- II **Marks: 20**

ILO Convent and Recommendation: Role of ILO, relevant conventions and recommendations in the furtherance of safety, health and welfare.

UNIT- III **Marks: 20**

Social Security – Legislation: Workmen's Compensation Act and rules, ESI Act and Rules, contract Labour (Abolition and regulation) At, employee's liability Act.

UNIT- IV Industrial Laws **Marks :20**

Other Important Legislation: Indian Boilers Act and Regulations, Indian Electricity Act and Rules, Indian Explosives Act and Rules, Petroleum Act and Rules, Gas Cylinders Rules, Calcium Carbide Rules, Radiation Protection Rules, Hazardous Material Transportation Rules, Static and Mobile(Un fires) pleasure vessel Rules, The Dock Workers (Safety, Health and Welfare) Act and rules , and regulations, The Building and other Construction Workers (Regulation of Employment and Conditions of service) Ordinance , 1995, Water (Prevention and Control of Pollution) Act and Rules, Air (Prevention and control of pollution) Act and Rules, Motor Vehicles Act and Transport of Rules, Environment Protection Act and rules, MSIHC Rules, Public Liability Insurance Act, Child Labour (Prohibition and regulation) Act and Rules.

UNIT- V **Marks : 20**

Storage of Petroleum Products: Introduction of New License for Storage of solvent from district Administration, Safety in Construction Industries: introduction of ISO: 9000/14000/18000, OSHA, EMS (Environmental Management System).

Text Books

1. Factory Act 1948
2. Recommendation Hand Book of ILO
3. Compassion Act as per IPC
4. Instruction Format For ISO.
5. Petroleum Act 193

Swami Vivekanand University, Sagar (M.P.)

Project Work

DIS(106)

1. Project work on “On Site Emergency Plan a Chemical / Explosive / Steel Industry”
2. Project work on study of fire hazards associated in Industrial process / activities and safety precautions taken for these hazards.
3. Project work on security arrangements of Red Alert
4. Project work on security arrangements of Mob Controlling
5. Project work on installation, servicing and maintenance of portable fire extinguisher installed in Industry.
6. Project work on safety and security arrangements of Railway Station.
7. Project work on firefighting equipment provided in an Industrial fire station.
8. Project work on safety arrangements in a Power Plant.
9. Fire Safety for storage of hazardous goods in Industry.
10. Project work on any one type of fire tender used in Industry.
11. Project work on safety arrangements in Explosive Plant / Storage.
12. Project work on fire safety arrangements in High rise Building.

Swami Vivekanand University, Sagar(M.P.)

Practical –I (Fire Fighting Drills)
DIS-107

List of Practical:

GROUP: **A) SQUAD DRILL**

B) LADDER

C) ROPE, LINE AND KNOTS

A) SQUAD DRILL:

TO STUDY THE SQUAD DRILL AND
TO VERIFY ITS APPLICATIONS IN FIRE SERVICES

Study of Squad Drill, working of Squad Drill, Importance of Squad Drill, What is Squad, Procedure for Formation of Squad, File, Rank, Sizing, Fall In, Fall Out, Types of Cautions given to the Squad.

TO STUDY THE MOVEMENTS OF A SQUAD

Attention, Stand at ease, Stand easy, Mark time, Double mark time, Right dress, Left dress, Dress up, Open order march, Close order march, Forward march, Backward march, Steps to the right, Steps to the left, Directions of a Squad, Turning to the left, Turing to the right, right about turn, Retire position, Advance position, Right Incline, Left Incline, Eyes right, Eyes left, Eyes front, from the right number, as you were, Proving of Parade.

TO STUDY THE MARCHING OF A SQUAD

Quick march, Double March, Slow march, Right wheel, Left wheel, Right turn, Left turn, Halt, Forward, Break up, Change direction, Change formation ,Reformation of Squad, Saluting, Reporting, Getting on Parade, Inspection Parade, Guard of honor.

B) LADDER :

TO STUDY THE FIRE SERVICE LADDERS.

Types of Ladders, Their construction, Uses, Identification of parts, Care and Maintenance of ladders.

TO STUDY THE 4 MAN EXTENSION LADDER DRILL

Equipment required, Formation of a Crew, Individual, Working procedure on ‘get to, work command’, Ladder pitching, Climbing, Rescue operation, Fire fighting, Ventilation procedure, Ladder carrying, Drill report.

TO CARRY OUT STANDARD TESTS OF EXTENSION LADDER.

String Test, Round Test, Standing Line Test, Acceptance Test, Deflection Test extension.

C) ROPE, LINE AND KNOTS:

TO STUDY THE USE OF ROPES AND LINES IN FIRE SERVICE.

Types and construction, Materials used in construction, Different types of Lines used in fire service for different purposes ,Like Rescue, Lifting, Lowering, Care and Maintenance.

TO CARRY OUT STANDARD TEST OF LINES.

Test procedure by 6 fire personals

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Practical –II (Fire Service Equipment) DIS(108)

List of Practical:

GROUP: A) HOSE AND HOSE FITTINGS
B) EXTINGUISHERS
C) PUMP AND APPLIANCES

A) HOSE AND HOSE FITTINGS :

TO STUDY FIRE FIGHTING HOSES.

Hose Drill Actions : Lifting hose, Lowering hose, Carrying hose, Laying hose, Connect hose, Disconnect hose, Under running, Remove the kink, Rolling. Identification of different types of hose fittings and their uses.

TO PERFORM HYDRANT DRILLS.

(a) 3 – man Hydrant Drill: Drill procedure with application of Hose and Hydrant Fittings: Add one length of hose, Remove one length of hose, Replace the burst Hose, Divide one line into two line using Dividing Breeching, Collect two line into one line using Collecting Breeching, Hydrant Gears and its operation

(b) 4 – man Hydrant Drill: Drill procedure with application of Hose and Hydrant ,Fittings: Add one length of hose, Remove one length of hose, Replace the burst Hose, Divide one line into two line using Dividing Breeching, Collect two line into one line using Collecting Breeching, Hydrant Gears and its operation.

TO CARRY OUT STANDARD TESTS OF FIRE FIGHTING HOSES.

B) EXTINGUISHERS:

TO STUDY SELECTION, OPERATION AND MAINTENANCE OF FIRE EXTINGUISHERS.

Study of different types of Fire Extinguishers (Water Expelling type, Foam type, DCP type, CO_2 type) With respect to constructional feature, capacity operation and use. in fires, It's effective application in extinguishments, Recharging procedure, Care and Maintenance, Performance test, Hydraulic test, Inspection procedure – Weekly, monthly, quarterly, half yearly, yearly.

(C) PUMP AND APPLIANCES:

TO PERFORM PUMP DRILL AND FIRE TENDER DRILL.

(a) 6 – man Trailer Pump Drill: Study, Workings, Importance, Equipment, Drill Procedure. Individual working of No.1 to No. 6, Application of different types of signals applied during pump operation.

(b) 6 – man Water Tender Drill: Mounting procedure, Dismounting procedure, Individual working procedure like – working with ladder, working with B.A. set, Soft suction, hard suction.

STUDY OF CENTRIFUGAL PUMP AND ITS OPERATION:

Operational procedure of centrifugal pump, priming system, Reading of gauges – Vacuum gauge, Pressure gauge, Compound gauge, Operator's fault, Cooling system, Water relay and its types.

STUDY OF FOAM & FOAM MAKING BRANCH PIPES.

Protein Foam, Aqueous Film Forming Foam (AFFF), Foam Making Branch 5X (FB 5X), Foam Making Branch 10 X (FB 10X), Inline inductor, Pick –up– Tube