OPJS UNIVERSITY, CHURU (RAJ.)

SYLLABUS

for

PG Diploma in Fire Safety & Management

(PGDFSM)

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School of fire & safety

Opjs University, Churu (Rajasthan)
2014-15

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PG Diploma in Fire Safety & Management  
(PGDFSM)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Paper code</th>
<th>Name of Papers</th>
<th>M.M.(T./S./P.)</th>
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<tbody>
<tr>
<td>1.</td>
<td>FSM-01</td>
<td>Safety and Accident Prevention</td>
<td>70+30</td>
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<td>2.</td>
<td>FSM-02</td>
<td>Fire Technology and Fire loss control</td>
<td>70+30</td>
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<td>3.</td>
<td>FSM-03</td>
<td>Organizational leadership and Safety communication</td>
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<td>4.</td>
<td>FSM-04</td>
<td>Safety at Work Place</td>
<td>70+30</td>
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<td>5.</td>
<td>FSM-05</td>
<td>Occupational Health and Industrial Pollution control</td>
<td>70+30</td>
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<td>6.</td>
<td>FSM-06</td>
<td>Safety in Construction Industry</td>
<td>70+30</td>
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<td>7.</td>
<td>FSM-07</td>
<td>Fire Prevention in Petrochemical Industries</td>
<td>70+30</td>
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<td>8.</td>
<td>FSM-08</td>
<td>Safety Management and Law</td>
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<td>9.</td>
<td>FSM-09</td>
<td>Industrial Project work</td>
<td>70+30</td>
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<td>10.</td>
<td>FSM-10</td>
<td>Practical and viva-voce</td>
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<td><strong>Total Marks</strong></td>
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Details of Syllabus

FSM-01-SAFETY AND ACCIDENT PREVENTION

UNIT - I
- Introduction to industrial safety
- Importance of safety in industry
- Definitions: Safety, Accident, Injury, Hazards etc.
- Cause of accident
- Cost of accident – direct & indirect
- Social cost
- Near miss accident
- Reportable accident
- Dangerous occurrence.

UNIT - II
- Principles of accident prevention
- Accident prevention programmes.
- Safety policy
- Safety organization
- Safety department
- Safety committees
UNIT – III
• Duties and responsibilities of safety officer.
• Safety promotion role by:
  · Government
  · Management
  · Supervisor
  · Workers
  · Trade union.
UNIT – IV
• Theories of accident occurrences
• Accident Ratio Study
• Domino theory
• multiple causation theory
• Epidemiological theory.
• Investigation of accident – process
• preparation of accident Investigation Report
• Accident Reporting.
UNIT - V
• First Aid – Fundamentals
• Burns
• Fractures
• Suffocation
• Bleeding wounds
• Bandaging and artificial respiration
• Handling and transportation of injured person
• CPR.
1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-02- FIRE TECHNOLOGY AND FIRE LOSS CONTROL

UNIT - I
• Chemistry of Fire
• Oxidation
• Slow – rapid – spontaneous combustions
• chain reaction
• Flash point & Fire point
• ignition temperature
• Classification of Fire
• Methods of extinguishment
• First aid fire fighting arrangement
• Types of fire extinguishers

UNIT – II
• Fixed Installation:
• External hydrant
• Ring mains
• Hose reels
• wet and dry riser
• Automatic sprinkler system
• Deluging system
• Drencher system
• Pre-mixed foams solutions
• Fire alarm system
• Flooding system.

UNIT - III
• Hydrostatic: Hydrostatic pressure
• Absolute and gauge pressure
• Pressure reassurances
• hydrostatic forces
• Hydro dynamics : Introduction
• Basic parameters of flow
• Newton’s Laws applied to fluids
• Work, energy and power
• Law of conservation.
• Flow in pipes and fire loses
• Hydraulic and energy guide lines
• Friction losses in pipes and loses
• Rule of hump computations

UNIT - IV
• Pumps and classification
• Discharge and suction head
• Pressure and power requirements
• Starting and trouble shooting
• Pump testing and relay operation.
• water hammer
• Parallel and series connections
• Branching lines, local losses

UNIT - V
• Fire streams
  · Introduction
• discharge from a nozzle
• range of a good fire stream
• Fire loss control:
• Principles of fire loss prevention
• fire protection manual.
• Fire safety data sheet
1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-03- ORGANIZATIONAL LEADERSHIP AND SAFETY COMMUNICATION

UNIT I
• Leadership, Role, Function and Style.
• Qualities of a good and effective leader
• Different roles and function of a leader.
• Different leadership styles.

UNIT II
• Communication
• Introduction, Definition of Communication.
• Definition of Organization
• Key stages in the communication cycle.
• Barriers on Communication.
• Principles of effective Communication.
• Systems or Management Communication.
• Impact of Information Technology on Communication

UNIT III
• Oral communication and written communication
• Oral communication practice
• Face to face communication.
• Telephonic conversation
• Interviews, employment interview.
• Non- verbal communication, With visible codes.
• Speaking skills
• Listening skills.
• Written communication
• Features, Choice and Phrases
• Writing skills
• Letter writing, Business letter, Characteristics parts etc....

UNIT IV
• Internal communication
• Reports, Preparatory steps, Structure or parts of report, Types of report, Circular,
• Endorsement, Memorandum.
• Meeting documentation
• Meeting in business
• Notice
• Agenda
• Minutes

UNIT V
• Managerial communication
• Communication as a tool of management
• Frustrations.
• Conflicts
• Attitude towards safety
• Communication with employees
• Conducting training
• Important of role playing in training.

1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-04- SAFETY AT WORK PLACE

UNIT - I
• Introduction
• Work place design concepts
• Purchasing policy
• Personal protective equipment,
  · Respiratory and non respiratory
• Machinery guard:
  · Types of machine guard fixed and removal type

UNIT - II
• Housekeeping: Definition – Advantage of house keeping
• 5’s concept of house keeping
• Industry hygiene’s
• Material handling
• Safety steps of manual handling
• mechanical handling
• types of mechanical handling.

UNIT - III
• Ventilation
• Natural ventilation
• Delusion ventilation
• Mechanical ventilation
• Local exhaust ventilation
• Advantages of ventilation
• Lighting
• Artificial lighting
• Types of artificial lighting
• Advantage of illumination

UNIT - IV
• Ergonomics
  · Office ergonomics
• Definition
• Objectives
• Physical aspects of muscular work
• Work place design
• Remedies

UNIT - V
• Work permit and NOC
• Definition
• Types of work permit
• Hot permit
• Cold permit
• Excavation permit
• Confined space entry permit
• Acid entry permit

• Preparation of work permit.
  1. Courseware to be provided by the institution
  2. Reference books are enclosed in annexure-1.

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FSM-05- OCCUPATIONAL HEALTH AND INDUSTRIAL POLLUTION CONTROL

UNIT - I
• Introduction
• Industrial Hygiene and Environmental Engineering
• Occupational Health

• Common occupational diseases – Mode of causation and effects.
• Prevention and control
• Evaluation of injuries
• Medical Examinations
• ILO recommendations concerning occupational health services
• Health records.
• Work Physiology
• Classification of work load – work capacity and man – job alignment.

UNIT - II
• Industrial Hygiene
• Physical hazards: Noise
• Vibration
• Improper illumination
• Thermal radiation
• X-rays and UV radiations
• Ionizing & non ionizing radiations
• Effects of exposure
• Maximum permissible exposure limits
• Preventive & control measure

UNIT - III
• Chemical hazards
• Dangerous properties of chemicals
• Dusts
• Gases
• Fumes
• Mists
• Vapours
• Smoke
• Threshold limit values material safety data sheets

UNIT - IV
• Environmental Engineering
• Pollution prevention
• Air pollution
• Nature of pollution
• Control devices
• Wet & dry scrubbers
• Filters
• Electrostatic precipitators
• Absorption and incineration process.
• Water pollution
• Physical & Chemical pollutants
• Biological
• Radio active pollutants and sources of water pollutants

UNIT - V
• Industrial waste control
• Stream pollution
• Liquid waste solid waste
• Gaseous waste and their harmful effects
• Waste control
• Waste treatment
• Physical treatment
• Sedimentation
• Flotation and filtration
• Chemical treatment
• Neutralization of acidic or alkaline waste
• Biological treatment
• Trickling filters
• Ultimate disposal of waste

1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-06- SAFETY IN CONSTRUCTION INDUSTRY

UNIT - I
• Introduction
• Building material
• Floor
• Opening
• Joints
• Stares
• Symptoms of building collapse
• Building plan
• Plan reading
• Symbols and abbreviation.
• Site layout
• site tidiness

UNIT - II
• Work at height
• Scaffolding
• Types of scaffold
• hoisting and lifting work
• falls and flying objects
• ladder safety
• concreting and cement work
• Shoring

UNIT - III
• Material handling:
• Manual handling
• Mechanical handling
• cranes and fork lifts
• powered equipments
• other material handling machinery
• Rigging
UNIT - IV
• Lock out and Tag out
• Personal protective equipment
• Construction house keeping
• Electrical safety
• Excavation
• confined space entry
• welding and cutting operation
UNIT – V
• Special fie safety in construction field
• Fire prevention
• Fire protection
• Site organization
• Emergency communication
• Escape plan and emergency meeting station
• Storage and handling of explosives and compressed gas
1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-07- FIRE PREVENTION IN PETROCHEMICAL INDUSTRIES

UNIT - I
• Introduction
• Toxic Chemicals
• Dusts, gases, fumes, vapours and smoke
• various exposure
• Effects
• Threshold limits
• Health hazards, health disorders.
• Static electricity, earthling
• Non sparking tools
• Spark arrestors etc.
UNIT - II
• Receiving and storing chemicals
• UN and other classifications of chemicals
• Transportation of chemicals
• Hazhem code
• Storage work permit systems
• Hot work
• Confined space work permit
• Flammable gas, dust, vapour etc.
UNIT - III
• Pipe lines in chemical factories
• Colour coding
• Air sampling
• Pressure vessels steam lines
• Toxic releases
• BLEVE.
UNIT - IV
• Inspection techniques for plants
• Reaction of vessel
• Reliability of vessels, test, corrosion
• Precautions in explosives
• Flammable solids liquids gases & vapours
• Vapours cloud formations and combating.
UNIT - V
• Petrochemical Industries
• Fire & explosion hazards
• Control facilities and their uses
• Petroleum refineries and oil rigs
• Refinery fires
• Tank fires and explosions, control facilities
• Rescue operations.
1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-08- SAFETY MANAGEMENT AND LAW

UNIT - I
• Introduction
• Safety Management
• Roll and functioning
• Risk
• Hazard
UNIT - II
• Risk assessment
• Risk control
• Risk avoidance
• Risk retention
• Risk transfer
• Risk reduction
• Risk assessment process
• Probabilistic Risk assessment
UNIT - III
• Damage control
• Total loss control
• System safety analysis
• Hazard operability study
• Failure mode effect analysis
• Fault tree analysis
• Job safety analysis
UNIT - IV
• Emergency planning and disaster management
  • Natural calamities
  • Fire explosion
  • Toxic gas release
  • Industrial explosion
  • On site emergency plan
  • Off site emergency plan
  • Mock drills
  • Compensations and fire insurance
UNIT - V
• Laws on safety (Introduction and objectives):
  • Factory act
  • Workmen compensation act
  • Indian boilers act
  • Indian Electricity act and rules
  • Indian explosives act
  • Gas cylinder rules
  • Environmental protection act
  • Insurance laws
1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure-1.

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FSM-09- INDUSTRIAL PROJECT WORK

Objective:
One month in-company training programme for the purpose of study, familiarization and preparation of industrial safety and fire management system.
FSM-10- PRACTICAL

DRILLS AND PRACTICAL SCHEDULE

OBJECTIVE
To provide entire practical related with safety and fire management according to the syllabus prescribed.

UNIT-I
• Drills
• Squad drill
• Hose drill
• Knots and lines
• Hydrant drill
• MTU drill
• Ladder drill
• Picking up drill

UNIT-II
• Practical training
• First Aid Fire Fighting Equipments
• Breathing apparatus
• Hydraulic pressure testing
• Industrial exposure training

UNIT-III
• Practical training
• Personal Protective equipment
• Fire alarm
• First aid
• Smoke chamber/confined space
• Industrial exposure training

NOTE:
(1) Drills and practical training will continue throughout the year according to unit wise.
(2) Industrial exposure training may be conducted at various industries and organizations.

annexure-1

REFERENCE BOOKS AND JOURNALS REQUIRED FOR THE PROGRAMME.

<table>
<thead>
<tr>
<th>Name of book</th>
<th>Author</th>
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<tbody>
<tr>
<td>1. Industrial Safety Management</td>
<td>N.K. Tara Fdar, K.J Tara Fdar</td>
</tr>
<tr>
<td>2. Fire Service First Responder</td>
<td>Daniel Limmer, Michael Grill,</td>
</tr>
<tr>
<td></td>
<td>IFSTA Senior, Michael A Wieder</td>
</tr>
<tr>
<td>3. Safety A personal Focus</td>
<td>David L Bever</td>
</tr>
</tbody>
</table>
4. Fire Equipment, David L. Bever
5. Industrial Safety, National Safety Council of India
6. Hand book of fire and Explosion Protection
   Engineering Principles for Oil, Gas,
   Chemical and Related Facilities-, Dennis. P. Nolan, PE
7. Engineering Chemistry, Jain & Jain
8. Industrial Management, Jain & Bawa
9. Thermodynamics, Aroma & Domkundwar
11. Remediation and Treatment Technologies, Dennis P Nolan P.E
12. Fire Technology, R.S. Gupta
13. Major hazard control, International Labor Office
15. Safety, health and working condition in the
   transfer of technology, International Labor Office
16. Radiation protection, International Labor Office
17. Fire service Manual (4 volumes)
18. TAC and NBC rules, Kerala Fire Force
19. Publications from International standard
   organizations like ISO, OSHA, IOSH, NEBOSH etc.
20. Industrial Safety, Health and environment
    Management systems. RK Jain and Sunil S Rao

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