



ACHARYA NAGARJUNA UNIVERSITY

2022 Onwards

Detailed Syllabus

ADVANCE DIPLOMA IN FIRE & SAFETY - 12 Months

Paper-1: Fire Engineering

Paper-2: Safety Management

Paper-3: Safety in Construction

Paper-4: Safety and the Law

Paper-5: Industrial Hygiene & Occupational Health

Paper-6: Safety in Chemical & Petrochemical industry



ACHARYA NAGARJUNA UNIVERSITY

Detailed Syllabus

ADVANCE DIPLOMA IN FIRE & SAFETY

PAPER-1

FIRE ENGINEERING

Unit-I

Basic Chemistry and physics of fire, Chemical reaction, Exothermic reaction and endothermic reaction, Transmission of heat, Flash and fire point, Ignition temperature, Flammables and combustible chemicals, Spontaneous combustion, Triangle of combustion, Tetrahedron fire, Spread of fire

Unit II

Classification of fire, General Causes of fire, types of fire extinguishers. Major FF appliances and special installations, Fire crash tender, Safety in storage of flammable and explosive materials & transportation / Handling,

Unit-III

Types of hose and its Characteristics, Pumps, primers, tenders and water relay, Introduction, definition, Different types of pumps, Different types of primers, Working principle of various pumps primers, Maintenance and trouble shooting, Testing of pumps, Advantages and disadvantages,

Unit-IV

Fire alarms and sirens – maintenance of fire trucks – foam generators – escape from fire rescue operations –fire drills –first aid for burns. SCBA and foam making equipments,

Unit-V

Fixed fire fighting installations using water, Hydrant or fire water system, Classification of hydrant system, Sprinkling system, Special fires and fire fighting, Air craft fire, Ships fire.

Reference Books

1. Derek, James, "Fire Prevention Hand Book", Butter Worths and Company, London, 1986.
2. Gupta, R.S., "Hand Book of Fire Technology" Orient Longman, Bombay 1977.
3. "Accident Prevention manual for industrialoperations" N.S.C., Chicago, 1982.
4. DinkoTuhtar, "Fire and explosion protection"



PAPER-2

SAFETY MANAGEMENT

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

Motivation to the employees – importance, safety education and training-training methods, assessment or evaluation of training programs. Hazard Identification Techniques and Risk Assessment.

Unit-V

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

Reference Books

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

Dangerous Properties of Industrial Materials Author: N Irving sax

Safety, Security and Risk Management – Singh U. K.

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



PAPER-3

SAFETY IN CONSTRUCTION

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. Safety in use of Hoists, Derricks & Cranes.

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

Unit-V

Occupational Hazards and Diseases relating to construction work. Health and welfare measures - emergency medical measures for construction site-treatment of injuries and rehabilitations.

Reference Books

Sp 70-2001 Hand Book of Construction Safety Practices, Bureau of Indian Standards, New Delhi.

Construction Safety – Publication: Prentice Hall- Author: Jimmie Hinze, 1997.

Safety, Security and Risk Management – Singh U. K.



PAPER-4

SAFETY AND THE LAW

Unit-I

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

Unit-II

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

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

Unit-IV

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

Unit-V

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 Books

- 1) An Introduction to Health and Safety Law: A Student Reference Hardcover – Import, 2017 by David Branson
- 2) Pressure Vessels for Industry – Mc Graw Hill by Larry M.Soring
- 3) Techniques of Safety Management-Mc Graw Hill by D.Peterson



PAPER-5

INDUSTRIAL HYGIENE & OCCUPATIONAL HEALTH

Unit-I

Definition of Industrial hygiene. Overview of Industrial Hygiene: control methods. Introduction to Occupational Health, Fundamentals Of Occupational Health, Need For Occupational Health & Monitoring, Tips 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 - work site analysis.

Unit-III

Occupational related common diseases arise at work site, diseases due to physical hazards, chemical hazards- route of entry to human system, biological etc. Diseases arising from dust and its control measures. community health and safety.

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. Fundamentals of first aid. Different types of artificial Respiration.

Reference Books

1. Barbara A. Plog. Fundamentals of Industrial Hygiene. 5th edition. National Safety Council Chicago. 2002
2. Industrial Safety Health and Environmental Management system Publication: Khanna Publishers Authors: R.K Jain and Sunil S. Rao.
3. Diberardins L.J. , 1998.Hand book of occupational safety and health, John Willey, New York



PAPER-6

SAFETY IN CHEMICAL & PETROCHEMICAL INDUSTRY

Unit-I

Safety in chemical industry, Criteria for siting and layout of chemical plants, Instrumentation for safe plant operations. Hazard in Unit Processes and Unit Operations. Work permit systems – Types of permit with details of each, Personal Protective Equipments, Hazard Analysis.

Unit-II

Recognition of chemical hazards-dust, fumes, mist, vapour, fog, gases, types, concentration, Exposure vs. dose, Use of Material Safety Data Sheets. TLV - Methods of Evaluation, process or operation description, Field Survey, Sampling methodology..

Unit-III

Handling, storage and usage of high pressure gas cylinders – Risks & precautions. Safety Precautions for working on pipelines, safe entry procedures to confined spaces including pressure vessels.

Unit-IV

Special safety precautionary measures for control of fire and explosion in handling/processing flammable liquids, gases, vapors, mists and dusts etc. BLEVE (Boiling liquids explosion/fighting fires involving pesticides. Fire emergency action plan. Deflagration and detonation.

Unit-V

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

Reference Books

1. Chemical Reaction Hazards – A guide to Safety by John Barton.
 2. The Chemical Industry – Mc Graw Hill by C.A. Heaton.
 3. Dangerous Properties of Industrial Materials Author: N Irving sax
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