

25PCIS06 SAFETY IN PROCESS PLANT AND EQUIPMENT (3-1-0)

Module - I (10 Hours)

SAFETY IN PROCESS DESIGN AND PRESSURE SYSTEM DESIGN

Design process, conceptual design and detail design, assessment, inherently safer design chemical reactor, types, batch reactors, reaction hazard evaluation, assessment, reactor safety, operating conditions, unit operations and equipment, utilities. Pressure system, pressure vessel design, standards and codes- pipe works and valves heat exchangers process machinery- over pressure protection, pressure relief devices and design, fire relief, vacuum and thermal relief special situations, disposal- flare and vent systems- failures in pressure system.

Module - II (10 Hours)

PLANT COMMISSIONING AND INSPECTION

Commissioning phases and organization, pre-commissioning documents, process commissioning, commissioning problems, post commissioning documentation Plant inspection, pressure vessel, pressure piping system, non-destructive testing, pressure testing, leak testing and monitoring- plant monitoring, performance monitoring, condition, vibration, corrosion, acoustic emission-pipe line inspection.

Module - III (10 Hours)

PLANT OPERATIONS

Operating discipline, operating procedure and inspection, format, emergency procedures hand over and permit system- start up and shut down operation, refinery units- operation of fired heaters, driers, storage- operating activities and hazards- trip systems- exposure of personnel colour coding of pipes and cylinders – Corrosion prevention for underground pipes.

PLANT MAINTENANCE, MODIFICATION AND EMERGENCY PLANNING

Management of maintenance, hazards- preparation for maintenance, isolation, purging, cleaning, confined spaces, permit system maintenance equipment- hot works- tank cleaning, repair and demolition- online repairs- maintenance of protective devices modification of plant, problems- controls of modifications. Emergency planning, disaster planning, onsite emergency offsite emergency, APELL.

Module - IV (10 Hours)

STORAGES

General consideration, petroleum product storages, storage tanks and vessel- storages layout segregation, separating distance, secondary containment- venting and relief, atmospheric vent, pressure, vacuum valves, flame arrestors, fire relief - fire prevention and protection- LPG storages, pressure storages, layout, instrumentation, vapourizer, refrigerated storages- LNG storages, hydrogen storages, toxic storages, chlorine storages, ammonia storages, other chemical storages underground storages- loading and unloading facilities- drum and cylinder storage- ware house, storage hazard assessment of LPG and LNG

References:

1. Lees, F.P., "Loss Prevention in Process Industries" Butterworth publications, London, 3rd Edition, 2005.
2. Sanoy Banerjee, "Industrial hazards and plant safety", Taylor & Francis, London, 2003.
3. Fawcett, H. and Wood, "Safety and Accident Prevention in Chemical Operations" Wiley inters, 2nd Edition.
4. McElroy, Frank E., "Accident Prevention Manual for Industrial Operations", NSC, Chicago.
5. Green, A.E., "High Risk Safety Technology", John Wiley and Sons.