CHEMICAL PROCESS SAFETY

Course Code: 13CH2105 **L P C**
4 0 3

Course Educational Objectives:

After the study of the subject students will be able to apply safety practices in any chemical industry.

1. They will be able to design suitable equipment with safety standards

Course Outcomes:

1. After learning the subject, students will be able to know about all the safety requirements of chemical industry in general.
2. They will be able to apply their knowledge to any specific chemical industry to maintain safe environment.
3. They will be able to correct any hazardous situation to prevent accidents.

UNIT-I

Introduction: Importance of process safety with examples of major accidents; which might cover chemical, petroleum & petroleum chemical Industrial

Process Hazards: Temperature & Pressure flow, level deviation on process Hazard, such as explosions, Toxic release, fires, rupture.

Ignition Sources: Flames, Hot surfaces, static electricity, and the like Explosions: Confined & Unconfined explosions, BLEVES, Dust Explosions.

UNIT-II

Material Hazards: **Flammability**: Flammability Characteristics of Liquid and Vapour, Dependence on Temperature estimation of Flammability, Flammability diagram.

Toxicity: Toxicology- How toxicants enter biological organisms, elimation by biological organisms, effect of toxicants on biological organism, Brief Toxilogical study, Threshold limit values, Permissible exposure limits, Reaction Hazards.

Burning Characteristics: Flash Point, Fire Point Auto ignitions, Temperature LFL, UFL, Flash point determination, Material Properties of Benzene, ethyl alcohol, Ethyl Alcohol, Ethylene Oxide, Caprolactam, Acetone, Acetic Acid, Phenol, Acrylonitrile, Polyprolene, Ploy Vinyl Chloride, Gasoline and Hazards.

UNIT-III

Hazard Analysis: Check – lists, fault trees, cause – consequence diagrams, HAZOP and other methods of study. Dow procedures for safety assessment.

Safety Devices: Relief valves and Rupture disks Explosive relief, flare systems

UNIT-IV

Design to Prevent Fire & Explosions: Inerting, Control of Static Electricity ventilation, explosion proof equipment and instruments, Sprinkler systems, miscellaneous design features for preventing fires and explosions

UNIT-V

Emergency Preparedness and Planning: Typical emergency Plan, On-Site and Off Site Plans, Emergency Control Programme, Individual responsibility during emergency.

TEXTBOOKS:

1. Dainel A. Crowe and Louvar J.F, *"Chemical process Safety"* PHI Series, 2002.

2. Sanders R Q, *"Chemical process safety"*, PHI, Elsevier science, 2004.

REFERENCES

1. Dawande S.D, *"Chemical Hazards and Safety",* Denette & Co, 2007.

******