Course code	Course Name	L-T-P -Credits	Year of Introduction
FS203	PRINCIPLES OF SAFETY MANAGEMENT	3-1-0-4	2016

Prerequisite : Nil

Course Objectives

- To introduce and provide an overview of safety engineering and the importance of safety profession.
- To learn the evolution of safety.
- To make the students acquire a sound knowledge in fundamentals of safety management.
- To impart the basic safety engineering principles.

Syllabus

Introduction-Safety, Nature of the concept of safety. Definitions, Theories of accident causation Safety psychology-general psychology factors, Safety organization, Safety policy, Safety officer, Accident prevention Methods, Communication. Motivation for safety, Housekeeping, Work permit system , Personal protection in the work environment , ANSI(Z16.1) , Cost of accidents, Safety sampling techniques, Accident investigation, Accident analysis, Safety through design, Ergonomics.

Expected outcome

At the end of this course the course, the students will have

i. exposed to fundamentals of safety engineering
ii. gained idea about nature scope and applications of safety engineering principles.

Reference Books

- *Accident Prevention Manual for Industrial Operations* : National Safety Council, Chicago.
- Alan Waring, *Safety Management System*, Chapman & Hall
- David L. Goetsch, *Occupational Safety and health*, Prentice Hall
- Dr. K.U.Misthri ."Fundamentals of industrial safety and health", Siddharth Prakashan, Ahmadabad.
- Heinrich H.W. "Industrial Accident Prevention" McGraw-Hill Company, New York,1980.
- John V. Grimaldi and Rollin H.Simonds, *Safety Manage*ment, All India Traveller Book Seller, Delhi.
- Lees F.P "Loss Prevention in process industries" Butterworth publications, London, 2nd edition,1990.
- N.V. Krishnan, *Safety Management in Industry*, Jaico Publishing House, 1997
- Ronald P. Blake, *Industrial Safety:*, Prentice Hall, New Delhi, 1973
- Ted S. Ferry, *Modern Accident Investigation and Analysis*, John Wiley & Sons
- Willie Hammer, *Occupational Safety Management and Engineering*, Prentice Hall

Web

- www.fullsafety.weebly.com
- www.osha.gov

Course Plan			
Module	**Contents**	**Hours**	**Sem. Exam Marks**
I	Introduction-Safety -Goals of safety engineering. Need for safety. Industrialization VS Accidents, Nature of the concept of safety-age old concept: Indian origin and foreign origin, the concept described. Message of the word 'SAFETY'. Safety and productivity. Definitions: Accident, Injury, Unsafe act, Unsafe Condition, Near miss, Dangerous Occurrence, Reportable accidents. Theories of accident causation-Heinrich's theory, frank birds domino theory, Hepburn's theory, V.L Gorse's Multiple Causation Theory, system model theory, Ferrell's human factors theory, Energy Release Theory	8	15%
II	Safety psychology-meaning and aim, present psychological safety problems- employers problem, employees problem. General psychological factors-attitudes, aptitudes, frustration, conflict, morale, fatigue, boredom and monotony Safety organization- objectives, types, functions, Role of management, supervisors, workmen, unions, government and voluntary agencies in safety. Safety policy. Safety department and size-Safety Officer-responsibilities, authority. Safety committee-need, types, advantages	8	15%
FIRST INTERNAL EXAMINATION			
III	Accident prevention Methods- Engineering, Education and Enforcement. Models of accident prevention. Safety Education & Training -Importance, Various training methods, Effectiveness of training, Behavior oriented training. Communication- purpose, barrier to communication. Motivation for safety-need of motivation, theories of motivation-Maslow's and McGregor's hierarchy theory of human needs, Herzbergs's and Myers' theory, methods of motivation. Housekeeping: Responsibility of management and employees. Advantages of good housekeeping. 5 s of housekeeping.	8	15%
IV	Work permit system- objectives, hot work and cold work permits, other work permits. Typical industrial models and methodology. Entry into confined spaces. Personal protection in the work environment, Types of PPEs, Personal protective equipment- respiratory and non respiratory equipment. Standards related to PPEs.	8	15%
SECOND INTERNAL EXAMINATION			
V	ANSI(Z16.1) Recommended practices for compiling and measuring work injury experience , Monitoring Safety Performance : Frequency rate, severity rate, incidence rate, activity rate, safety "t" score, safety activity rate –problems. Cost of accidents-Computation of Costs- Utility of Cost data. Plant safety inspection, types, inspection procedure. Safety sampling techniques. Job safety analysis (JSA), Safety surveys, Safety		

	audits, Non conformity reporting (NCR). Safety Inventory Technique. The practice of safety management-the significance of risk acceptability	10	20%
VI	Accident investigation –Why? When? Where? Who? & How? . Basics- Man- Environment & Systems .Process of Investigation – Tools-Data Collection-Handling witnesses- Case study. Accident analysis –Analytical Techniques-System Safety-Change Analysis-MORT-Multi Events Sequencing-TOR. Safety management and the computer, loss prevention. Safety through design-design model-benefits. Incident recall technique (IRT). Ergonomics-definition-application of ergonomic principles in the shop floor- work benches- seating arrangements-layout of electrical panels-switch gears-motion economy-location of controls-display locations-machine foundations.	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100 Duration: 3 Hours

Part – A: 5 MARK QUESTIONS

There will be two questions from module 2 and module 3 and one question each from remaining modules (5x8 = 40)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions

(3 x10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions

(2 x15 = 30 marks)