GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: III

Environmental Management

Subject Name **Industrial Hygiene and Safety**

Sr.No	Course content
1.	**Introduction to Industrial Hygiene :** Historical aspects of Industrial Hygiene, Concept and Definition, Role of Industrial Hygienist and scope, Difference between industrial hygiene and occupational health, Difference between industrial hygiene and air pollution, Work Co-ordination between industrial hygienist, safety officer, environmental engineer/ officer; factory medical officer for the purpose of environment, safety , hygiene and health. Basic concept of EHS (Environment, Health & Safety) programme and their integration, Benefits of Industrial Hygiene with reference to environmental Management, Introduction of ACGIH ,OSHA, NIOSH,ILO,EPA etc, Industrial Hygiene survey work, monitoring and preparation of database
2.	**Air Sampling and Measurement and Strategies :** Type of monitoring – Exposure Assessment Monitoring, Work place or Area monitoring, Personal Exposure Monitoring, Biological Monitoring, Methods of Sampling and analysis, knowledge of monitoring and analytical instrumentation, Significance of Threshold Limit Value, TLV, STEL, Ceiling limit , BELs
3.	**Engineering Control :** Concept and principal of engineering control , Hierarchy of Control, Substitutions, changing the process, modification of process, isolation, wet method, enclosure of process or material, Administrative control, personal hygiene, house- keeping and maintenance, Personal Protective Equipment(Device) (PPE), Non-respiratory PPE, Respiratory PPE, Testing Procedures and standards, Instruction and training, Special control measures, control banding
4.	**Industrial Ventilation :** Introduction to Ventilation & General principal of ventilation, General Industrial ventilation, Local exhaust ventilation (LEV) systems,Non-standard condition, HVAC and makeup air systems, Testing of ventilation system, Engineering control in Cement, Textile, Fertilizers, Battery, Chemical, Glass industries as case study
5.	**Ergonomics :** Introduction of ergonomics and its constituents, Application of Ergonomics for Safety and Health, Load Carrying, Hand Tool and their use, Work Station Design, Machine Controls and Display
6.	**Hazards Identification, Assessment and Control Techniques :** Types of Accidents and performance rates, Accidents and incident investigation, Reporting and analysis, Safety appraisal and control techniques, Hazard identification and risk assessment techniques, Major accident hazard (MAH) controls
7.	**Physical Aspect of Environment: Noise :** Instrumentation for noise measurement and techniques, effect of noise ,control of noise, Human Vibration, effect and control, Heat Stress, effect and control, Poor Illumination, effect and control, Radiation, Non-ionization and Ionization

8.	**Introduction of Toxicology:** Definitions of toxicology, Routes of entry into the body, Absorption ,distribution and excretion of toxic substances, Site of action-local or systematic effects, Toxic effects of heavy metals like Pb, Cd, Mn, As, Hg, Cr, Ni, etc., Toxic Effects of Solvents, Toxic effects of gases like Chlorine, Ammonia, Carbon monoxide, SO_2, NOX
9.	**Introduction to Occupational Health and Diseases: Definition and scope, Occupational Hazards:** Chemical agents, physical agents, biological agent, psychological agents, physiological agents. Ergonomical agents etc., Occupational Hazards on human health, Notifiable diseases under schedule-111 of the Factories Act, Occupational Diseases like Coal miners' pneumoconiosis, Silicosis, Asbestosis, Bysinosis, Occupational Dermatitis, Occupational Asthma, Occupational Stress, Musculoskeletal injuries in various industries, Occupational Health and Hygiene services at work place, (a) Occupational Health and Hygiene centre at workplace(b)Ambulance Van and First aid(c) Factory medical officer, hygienist, staff and equipments, Introduction to Epidemiology and Biostatistics
10.	**Legislation on Industrial Safety and Occupational Health:** Factory's Act, Miner's Act, Other Acts related to safety and Occupational health and its integration with Environment Act

Term work:

Term Work will comprise of assignments and exercises based on basic concepts and case studies

Reference Books:

1 Industrial Hygiene and Toxicology By Frank A Patty (Revised Edition, Vol-1, 2, 3). Also available in form of CD
2 Industrial Hygiene By Robert W Allen, Michael D Ellis and Andrew W Hart
3 Occupational Health Practice by R S F Schilling
4 Occupational Hygiene and Risk Management , a multi media package by Megan Tranter
5 Industrial Ventilation, A Manual of Recommended Practice, Edition 23, By American Conference of Government Industrial Hygienist(ACGIH)
6 Air Sampling instruments for Evaluation of Atmospheric Contaminants Edition 3 By ACGIH
7 SKC The world leader in Air Sampling Technology : 1998 Comprehensive Catalog and air Sampling Guide
8 Fundamentals of Industrial Safety and Health By K U Mistry(2008), Publisher Siddharth Prakashan, Janaki Society, Ahmedabad-380014
9 Occupational Lung Diseases by Hans Weill and Turner
10 Occupational Health and Hygiene: Guide Book for the WHSO by David Grantham
11 ILO Encyclopedia on Occupational Health and Safety, Vol-1 and Vol-2
12 Bruel & Kjaer : Noise Control: Principles and Practice
13 Ergonomics at work by David J Oborne, John Wiley and Sons