

<b>B.E. CIVIL ENGINEERING</b> Choice Based Credit System (CBCS) <b>SEMESTER – VI</b>			
<b>Occupational Health and Safety (3:0:0) 3</b> (Effective from the academic year 2023-24)			
Course Code	21CV651	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3 Hours
<b>Course Objectives:</b> This course will enable students to:			
<ol style="list-style-type: none"> <li>1. Gain historical, economic, and organizational perspective of occupational safety and health.</li> <li>2. Investigate current occupational safety and health problems and solutions.</li> <li>3. Identify the forces that influence occupational safety and health.</li> <li>4. Demonstrate the knowledge and skills needed to identify work place problems and safe work practice</li> </ol>			
<b>Module – 1</b>			
<p><b>Introduction to the course:</b> Relevance of OHS in Global Industrial Scenario and impacts on Economy. Job opportunities as Safety Engineers. OSHA Limitations and the Need for Change.</p> <p><b>Occupational Hazard and Control Principles:</b> Safety, History and development, National Safety Policy. Occupational safety and Health Act (OSHA), Occupational Health and Safety administration - Laws governing OSHA and right to know. Accident – causation, investigation, investigation plan, Methods of acquiring accident facts, Supervisory role in accident investigation. Program Workers’ Compensation - Unsafe Acts vs. Unsafe Conditions.</p> <p style="text-align: right;">(8 Hours)</p>			
<b>Module – 2</b>			
<p><b>Ergonomics at Work Place:</b> Ergonomics Task analysis, Preventing Ergonomic Hazards, Work space. Envelops, Visual Ergonomics, Ergonomic Standards, Ergonomic Programs. Hazard cognition and Analysis, Human Error Analysis – Fault Tree Analysis – Emergency Response - Decision for action – purpose and considerations.</p> <p><b>Indoor Air Quality:</b> Asbestos Awareness - Blood-borne Pathogen</p> <p style="text-align: right;">(8 Hours)</p>			
<b>Module – 3</b>			
<p><b>Fire Prevention and Protection:</b> Fire Triangle, Fire Development and its severity, Effect of Enclosures, early detection of Fire, Classification of fire and Fire Extinguishers.</p> <p><b>Electrical Safety:</b> Standard and Lockout/Tagout - Product Safety: Technical Requirements of Product safety - Process Safety Management. Exit Routes, Emergency Action Plans and Confined Spaces &amp; Entry</p> <p style="text-align: right;">(8 Hours)</p>			

#### Module - 4

**Health Considerations at Work Place:** Types of diseases and their spread, Health Emergency. Principles of Personal Protective Equipment/Clothing, types and advantages, effects of exposure and treatment for engineering industries, municipal solid waste. Environment management plans (EMP) for safety and sustainability. Forklift Safety/Heat Stress/Ladder Safety /Scaffold Safety.

(8 hours)

#### Module - 5

**Principles of Industrial Hygiene - Occupational Health and Safety Considerations:** Water and wastewater treatment plants, Handling of chemical and safety measures in water and wastewater treatment plants and labs, Construction material manufacturing industries like cement plants, RMC Plants, precast plants and construction sites. Policies, roles and responsibilities of workers, managers and supervisors. OSHA Record Keeping

**Design based Problems (DP)/Open Ended Problem:** Analysis of Compliance wrt OHS at different Industries/work places.

(8 hours)

**Course Outcomes:** The students will be able to:

- CO1: Compare Occupational Health and Safety management principles for safety and sustainability.
- CO2: Analyse principles of OHS while testing for exposure limits, risk assessment, severity rating and risk probability.
- CO3: Evaluate accident causation and associated hazards, and consequently Prioritise mitigation measure w.r.t. work-place ergonomics.
- CO4: Formulate Occupational Health and Safety Considerations and Policies for Work places.
- CO5: Identify latest techniques and developments in Occupational Health and Safety engineering.

#### **Textbooks:**

3. Goetsch D.L, "Occupational Safety and Health for Technologists", Engineers and Managers Prentice Hall, 1999.
4. Heinrich H.W, "Industrial Accident Prevention-A Scientific Approach", McGraw-Hill Book Company, 2007.

#### **References:**

1. Colling D.A., "Industrial Safety Management and Technology", Prentice Hall, 1990.
2. Della D.E. and Giustina Van Nostrand Reinhold, "Safety and Environmental Management", 1<sup>st</sup> Edition 1996.