

**Centre for Continuing Education (CCE), SVNIT, Surat**  
**Value Added Certificate Course**  
**Safety, Health & Environment**  
**Course Content**

Sr. No.	Topics
1	<b>Introduction:-</b> Need for Safety (Humanitarian, Legal and Economic, Accidents and Total Loss Control Concept, Cost of Accident and calculations, Safety Management System (OHSAS-18001-2007 standard), Safety & Productivity, Behavioural safety
2	<b>Process Safety Management (PSM):-</b> Inherently Safer Design, built-in protections with alarms & trips logics, Fire & Gas detection system, Hazardous area classifications and Control of ignition sources (explosion-proof designs), SIL (Safety Integrity Level) Criteria, ESDS, Safety aspects in flare & PSV design and blow-down system, Colour coding of process piping, DCS Control station & Ergonomics, OSHA's and API's PSM elements, Permit –to –Work, Hazmat Storage & Transportation safety, Pressure vessel safety in operations, MSDS, Product Safety
3	<b>Safety Hazard &amp; Risk Assessment:-</b> Hazard –vis-à-vis- Risk, HAZOP, HAZAN, HAZID techniques, Process Hazard Analysis (PHA), What-if technique, Fault-Tree and Event-Tree Analyses, Cause –consequence Diagram, Consequence Analysis, Process Explosions e.g. BLEVE, UCVCE etc, Case studies on Process failures, Chemical Disaster Planning
4	<b>Occupational Health &amp; Industrial Hygiene:-</b> Definition of Health & Occupational Health  <b>Toxicology -</b> Routes of entry, Toxicity effects, BTLVs (biological TLVs), Biological process, Threshold Limit Values (TLVs), Toxic risks (Dow & Mond indices), Dos-response relationship, Biological Monitoring
5	<b>Health Risk Assessment:-</b> Walk –through survey, Reference dose, Health Risk Criteria, Acute & Chronic effects, Action level for Carcinogens, Chemical exposure in laboratory, Risk Characterization
6	<b>Industrial Hygiene: -</b> Identification of physical, chemical and biological hazards, Work environment monitoring, Measurements (noise, vibration, illumination, gases/vapours etc), Evaluation of exposures against Permissible exposure limits, Control methods, Numerical
7	<b>Environment Management:-</b>  <b>Air Environment –</b> An overview of air pollution and its effects, Air Emissions (Sox/NOx/CO/HC/SPM etc), Ambient and Clean air standards, Ambient and Stack monitoring system, Emission control techniques, Odour pollution and control

**Water Environment** – An Overview of Water Pollution and its effects, Industrial Effluent Treatment Plants, its operations, Municipal waste water treatment, Reuse & recycle, Disposal standards (MINAS) and options

**Land Environment** – Solid waste generation and characterization, Hazardous waste and its categorization, Municipal Solid waste (MSW) and its disposal, Reuse & Recycle, Transportation of hazardous waste, Design and operations of a Waste disposal site

**Noise Pollution** – Fundamentals, sources, types of noise, Effects of Noise (auditory and non-auditory), Measurements, Noise control principles (at source, at path and at receiver), Noise control methods / vibration damping, Numerical