Semester V

Disaster Management and Emergency Preparedness

1.1 Course Number: FSE301
1.2 Contact Hours:3-0-0 Credits:9
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: Basics of Environmental Studies
1.5 Syllabus Committee Members: Ms. Ananya Borah &Dr. Nilambar Bariha

2. Objective:

i) To understand the basic concepts of disaster management and promote awareness of different types of disasters and their impacts.
ii) To impart knowledge to create appropriate planning, preparation and response for emergency treatment in disaster situation.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Introduction**	Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Man made Disasters: Difference, Nature, Types and Magnitude, Disaster management act, 2005	8
2	**Repercussions of Disasters and Hazards**	Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.	9
3	**Disaster Prone Areas in India**	Study of SeismicZ ones; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference To Tsunami; Post Disaster Diseases and Epidemics	8
4	**Disaster Preparedness and Management**	Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.	9
5	**Risk Assessment**	Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.	8
Total			**42**

4. Reading

4.1 Reference Books:

Goel, S.L. Disaster Administration and Management Text and Case Studies, Deep & Deep Publication Pvt. Ltd., New Delhi, 2009.
Rai, N. Singh, A.K. Disaster Management in India: Pe respective, issues and strategies, New Royal book Company, 2007.
Pardeep, S. Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi,2001.

5. Outcome of the Course:

1) Understand the world-wide distribution of hazards and disasters and know the similarities and differences between natural and technological disasters.
2) Gain preparedness skills that increase community effectiveness in responding to disaster.

Health, Safety and Environment

1.1 Course Number: FSE302
1.2 Contact Hours:3-0-0 Credits:9
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: NA
1.5 Syllabus Committee Members: Ms. Ananya Borah & Dr. Nilambar Bariha

2. Objective:

i) To create the awareness among students regarding importance of safety in industries.
ii) To introduce the definitions, concepts, methodologies used in management of occupational safety in industries.
iii) Students will be able to recognize and evaluate occupational safety and health hazards in the workplace, and to determine appropriate hazard controls following the hierarchy of controls.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Occupational health and safety management**	General definitions: Health, safety, environment protection, occupational accident, hazard, risk, near misses, health and safety culture. Key elements for health and safety system - Importance of health and safety policy, aim and objective of health and safety policy -Health and safety culture, factors influencing health and safety culture -Influencing factors for health and safety management.	9
2	**Behavior based Safety**	Philosophy of safety - Need of safety philosophy - Safety psychology -Need of safety psychology - Meaning and aim of safety psychology -Factors affecting safety at work: attitude, aptitude, frustration, morale, motivation, individual differences.	9
3	**Safety Aspects in Confined Space**	OSHA Guideline for Confined Space Entry, Permit Requirement for Confined Space Entry, Duties of Persons involved in Confined Space Entry.	8
4	**Work Permit System**	Cold work permit system, Hot work permit, Confined space work permit, Electrical related work permit, Work at height Permit.	8
5	**Environment**	Scope and Importance; need for public awareness about our environment; Economicand social security; Environment impact of transportation and Mining.Environmental Impact Assessment (EIA) — purpose, procedure and benefits of EIA; Biodiversity and its conservation; Sustainable development. Global warming and greenhouse effect, urbanization, acid, ozone layer depletion and nuclear accident.	8
Total			**42**

4. Reading

4.1 Reference Books and Standards:

1. Safety, Health and Working Condition in the Transfer of Technology - Inter National Labor Office.
2. Industrial Safety, Health and Environment Management System - RK Jain and Sunil S Rao.
3. Publications from Inter National Standard Organizations like ISO, OSHA, IOSH, NEBOSH etc.
4. Encyclopedia of Occupational Health and Safety - Inter National Labor Office.

5. Outcome of the Course:

On completion of this course, students will be able to-

1) Demonstrate the knowledge and understanding of basic terms in safety management.
2) Understand safety organizational requirements for effective safety management.
3) Evaluate the workplace hazards and apply controls measures using hierarchy of control.

Legal Aspects of HSE

1.1 Course Number: FSE303
1.2 Contact Hours:3-0-0 Credits:9
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: Health, Safety and Environment
1.5 Syllabus Committee Members: Ms. Ananya Borah & Dr. Nilambar Bariha

2. Objective:

i) To create the awareness among students regarding the various legislations applicable to industries.
ii) To introduce the definitions, concepts, requirements of various safety, health environment and welfare-related acts and rules.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Factories Act**	Definitions, Preliminary, Inspecting staff, Health, Safety, Provisions relating to hazardous processes, Welfare, Working hours of adults, Employment of young persons, Special provisions. Dock Workers (Safety, Health and Welfare) Act-Definitions, Powers of inspectors, Power of Govt. to direct inquiry, Obligation of dock workers. Duties of Safety Officers, Reporting of accidents, Emergency Action Plan, Safety Committee.	9
2	**Worker's Compensation Act**	Definitions, Employer´s liability for compensation, Calculation of amount of compensation. ESI Act and Rules: Applicability, Definitions and Benefits. Public Liability Insurance Act and Rules- Definitions, Calculation of amount of relief, Environmental Relief Fund, Advisory Committee, Powers of District Collector, Extent of Liability, Contribution to Relief Fund.	8
3	**Explosives Act & Petroleum Act**	Definitions, Categories of Explosives, General Safety Provisions, Use of Explosives, Grant of license, Notice of Accidents, Inquiry into ordinary and more serious accidents, Extension of definition to other explosive substances. Explosives Rules, SMPV Rules and Gas Cylinder Rules (in brief). Petroleum Act with important rules - definitions, safety in the import, transport, store, license, exemption, notice of accidents.	9
4	**Environmental Regulations**	General powers of the central government, prevention, control and abatement of environmental pollution Biomedical waste (Management and handling Rules), 1989-The noise pollution (Regulation and control) Rules, 2000- The Batteries (Management and Handling Rules) 2001- No Objection certificate from statutory authorities like pollution control board. Air Act 1981 and Water Act 1974. Central and state boards for the prevention and control of air pollution powers	8

		and functions of boards – prevention and control of air pollution and water pollution.	
5	**International Occupational Safety Standards**	Occupational Safety and Health act of USA (The William-Steiger's Act of 1970) – Health and safety work act (HASAWA 1974, UK) – OHSAS 18000 – ISO 14000 – ISO 45001 - Benefits and Elements.	8
Total			**42**

4. Reading

4.1 Reference Books:

1. Factories Act.1948
2. The Dock Workers (Safety, Health and Welfare) Act, 1986.
3. Workmen Compensation Act ,1923.
4. The Public Liability Insurance Act, 1991.
5. Petroleum Act,1934 & Petroleum Rules, 2002, PESO.
6. The explosives Act,1884; Explosive Rules,2008
7. "The Environment Act (Protection) 1986 with allied rules", Law Publishers (India) Pvt. Ltd., Allahabad.
8. "Water (Prevention and control of pollution) act 1974", Law publishers (India) Pvt. Ltd., Allahabad.
9. "Air (Prevention and control of pollution) act 1981", Law Publishers (India) Pvt. Ltd., Allahabad.

5. Outcome of the Course:

On completion of this course, students will be able to-

1) Gain knowledge on laws relevant and concerning towards welfare, working hours and health and safety of workers engaged in industries.
2) Understand and learn about the legal aspects granting of license for storage, transportation and usage of explosive and flammable substance as per various acts and rules.
3) Learn concept, agencies and provisions are per various environmental laws.
4) Evaluate the compliance legal and other requirements in a workplace.

Humanities

1.1 Course Number: HU301
1.2 Contact Hours: 2-0-0 Credits: 6
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: Diploma level English
1.5 Syllabus Committee Members: DUGC

2. Objective:

i) Foster intellectual curiosity, global knowledge, critical thinking, personal responsibility, and ethical and cultural awareness.
ii) Prepare students to use language effectively.
iii) Establish a framework for students to develop an aesthetic appreciation for fine arts.
iv) Prepare students to be responsible citizens, lifelong learners, and world-ready leaders in their chosen fields.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Introduction to Sociology**	Definition of sociology, some sociological concepts: social structure, status, role, norms, values etc. Socialization, and culture and change. Social stratification - various approaches and concept of social mobility. Population and society - Trends of demographic change in India and the world, Human Ecology, Trends of Urbanization in the developing countries and the world. Major social institutions - Family and marriage, caste and tribe and organizations: (i) formal organization (bureaucracy) (ii) informal organization. Processes of social change - Modernization (including Sanskritization), industrialization, environmental/ecological changes and development. Social movements - protest movements, reformist movement and radical movements in India.	9
2	**Introduction to Literature**	Nature of Literature: Literature as a Humanistic Experience. Definitions: (i) Humanities: concern with culture, values, ideologies; (ii) Literature: concepts of imitation, expression, intuition & imagination. Major Themes of Literature: Nature, Science, Selfhood, Love, Rebellion. The Language of Literature: Modes of literary and non-	7

		literary expression. The concepts of Figurative language, imagery, symbolism, style. The Forms of Literature: Prose Narratives (short stories & novels) Poetry, Drama and Essays (Suitable texts are to be chosen by the instructors), Use of a Learner Dictionary.	
3	**Introduction to Philosophy**	Philosophy and History of Science: Growth of scientific knowledge: factors leading to the emergence of modern science. Conceptual evolution: internal and external history. Methodology of science: induction, falsifications, confirmation and probability. Nature of scientific laws and theories: realism, instrumentalism, and under-determination. Relationship between scientific observation, experiment and scientific theory. Nature of scientific explanation: teleological explanations and the covering law model. Selected case studies on scientific theories. Logic and the nature of mathematical reasoning: Inductive and deductive forms of reasoning. Nature of axioms: formal axiomatic systems. Concept of consistency, independence, and completeness. Nature of rules of inference and proof. Selected examples of axiomatic systems and proof procedures. Cognition: Current approaches to the understanding of mind and mental processes: empiricist, rationalist, behaviorist and cognitivist. Ethics: Impact of science and technology on man and society: elements of environmental and professional ethics	7
Total			**23**

4. Readings:

4.1 Textbook/Reference Books:

(A) Introduction to Sociology:

(a) L. Broom, P. Selznick and D. Dorrock, Sociology, 11th Edn. 1990 (Harper International).
(b) M. Haralambos, Sociology: Themes and Perspectives, Oxford University Press, 980.
(c) M.S.A. Rao (ed) Social movements in India, vols. 1-2, 1984, Manohar.
(d) David Mandelbaum, Society in India, 1990, Popular.
(e) M.N. Srinivas, Social change in modern India, 1991, Orient Longman.
(f) Guy Rocher, A. General Introduction to Sociology, MacMillan, 1982.

(B) Introduction to Literature:

(a) David Murdoch (ed.). The Siren's Song: An Anthology of British and American Verse, Orient Longman, 1988.

(b) S. Alter & W. Dissanayake (eds.) The Penguin Book of Modern Indian Short Stories. Penguin Books (India), 1989.
(c) Bertrand Russell, Impact of Science on Society. Allen &Unwin, 1952.
(d) Henrik Ibsen, A Doll's House, Macmillan India, 1982.
(e) George Orwell, Animal Farm, Penguin, 1951.
(f) J. Bronowski. The Ascent of Man, BBC, 1973.

(C) Introduction to Philosophy:

(a) A.C. Grayling (ed.) Philosophy: A Guide through the Courses/Subjects, Oxford Univ. Press, London, 1995.
(b) Marx W. Wartofsky, Conceptual Foundations of Scientific Thought: An Introduction to the Philosophy of Science, Macmillan, London, 1968.
(c) I.B. Cohen, The Birth of a New Physics, Vakils, Feffer and Simons Pvt. Ltd., Bombay, 1968.
(d) H. Eves and C.V. Newsom, Foundations and Fundamental Concepts of Mathematics, Boston, PWS-Kart Pub. Co., 1990.
(e) K.E. Goodpaster and K.M. Sayre (eds.) Ethics and Problems of 21st Century, Univ. of Notre Dame Press, London, 1979.
(f) S.D. Agashe, A. Gupta & K. Valicha (eds.) Scientific Method, Science, Technology and Society: A Book of Readings, Univ. of Bombay Press, 1963.

5. Outcome of the Course:

Students will demonstrate:

Knowledge of the conventions and methods of at least one of the humanities in addition to those encompassed by other knowledge areas required by the General Education program.

Engineering Economics

1.1 Course Number: MT301
1.2 Contact Hours: 2-1-0 Credits: 8
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: Diploma level Mathematics
1.5 Syllabus Committee Members: DUGC

2. Objective:

i) To make fundamentally strong base for decision making skills by applying the concepts of economics.
ii) Educate the students on how to systematically evaluate the various cost elements of a typical manufactured product, an engineering project or service, with a view to determining the price offer.
iii) Prepare engineering students to analyze profit/revenue data and carry out make economic analysis in the decision-making process to justify or reject alternatives/projects.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Introduction to Economics**	Introduction to economics – Flow in an economy – Law of supply and demand – Concept of engineering economics – Engineering efficiency – Economic efficiency – Scope of engineering economics – Element of costs – Marginal cost – Marginal revenue – Sunk cost – Opportunity cost – Break-even analysis – V ratio – Elementary economic analysis – Material selection for product design selection for a product – Process planning.	10
2	**Value Engineering**	Make or buy decision – Value engineering – Function – Aims – Value engineering procedure – Interest formulae and their applications –Time value of money – Single payment compound amount factor – Single payment present worth factor – Equal payment series sinking fund factor – Equal payment series payment Present worth factor – Equal payment series capital recovery factor – Uniform gradient series annual equivalent factor – Effective interest rate – Examples all methods.	8
3	**Cash Flow**	Methods of comparison of alternatives – Present worth method (Revenue dominated cash flow diagram) – Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram) – Annual equivalent method (Revenue dominated cash flow diagram, cost dominated	8

		cash flow diagram) – Rate of return method – Examples all methods.	
	Total		**26**

4. Readings:

4.1 Textbooks:

1. Panneer Selvam, R., "Engineering Economics", Prentice Hall of India Ltd, 2001.
2. Smith, G.W., "Engineering Economy", Lowa State Press, 1973.

4.2 Reference books:

1. Park, C.S., "Contemporary Engineering Economics", Prentice Hall of India, 2002.
2. Newman, D.G. and Lavelle, J.P., "Engineering Economics and Analysis", Engineering Press, 2002.
3. Degarmo, E.P., Sullivan, W.G. and Canada, J.R, "Engineering Economy", Macmillan, 1984.
4. Grant, E.L., Ireson, W.G. and Leavenworth, R.S., "Principles of Engineering Economy", Ronald Press, 1976.

5. Outcome of the Course:

Upon completing the course, students will be able to:

1) Understand major principles of economic analysis for decision making among alternative courses of action in engineering.
2) Apply economic principles to prices and quantities in competitive supply and demand for goods and for money.
3) Solve economic problems involving comparison and selection of alternatives by using analytical techniques including benefit-cost ratio and breakeven analysis.

Fire Ground Operations –III

1.1 Course Number: FSE306L
1.2 Contact Hours:0-0-2 Credits:2
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: NA
1.5 Syllabus Committee Members: Ms. Ananya Borah & Dr. Nilambar Bariha

2. Objective:

i) To help the students understand the fundamentals and relevance of first aid and deal with emergency situations.
ii) To enable students to understand know the limits of basic first aid and the legal perspective of First Aid, Safety at the workplace and highlights of accident prevention.
iii) To expose students to a wide range of duties of the employer as a First Aider.

3. Course Content:

Sl.No.	List of Experiments
1	First Aid – Introduction, Aims of First Aid, Roles & Responsibilities of a First Aider.
2	Contents of First Aid Kit.
3	First Aid Techniques: Dressings, Bandages and Transportation of Injured Person.
4	First Aid Measures to be Taken for a Person Suffering from Heat Stroke at the Accident Site.
5	First Aid for Electric Shock and Electrical Burns.
6	First Aid for Fractures, Dislocations, Sprains and Strains.
7	Emergency First Aid Cardio Pulmonary Resuscitation (CPR) Procedures.
8	First Aid for Burns and Scalds.
9	First Aid for Heavy Bleeding.
10	First Aid for Eye Injuries.

4. Outcome of the Laboratory:

On completion of this course, the students will be able to

1) Gaining knowledge of principles of first aid
2) Gaining knowledge on human anatomy and safety tools during emergency
3) Demonstrate Cardiopulmonary Resuscitation.

Departmental Elective/Open Elective

Fundamentals of Environmental Impact Assessment

1.1 Course Number: FSE304
1.2 Contact Hours:3-0-0 Credits:9
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: NA
1.5 Syllabus Committee Members: Ms. Ananya Borah & Dr. Nilambar Bariha

2. Objective:

i) To introduce the concepts, procedures and methodology of Environmental Impact Assessment (EIA).
ii) To develop a critical awareness to evaluate the environmental aspects of business operations.
iii) To expose the students to the need for environmental impact assessments and how to prepare the various EIA documents.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Introduction**	Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) -Environmental Risk Assessment (ERA) - Legal and Regulatory aspects in India – Types and limitations of EIA - Terms of Reference in EIA- Issues in EIA - national – cross sectoral - social and cultural.	9
2	**Environmental Analysis and Assessment Techniques**	Components - screening - setting - analysis - prediction of impacts - mitigation. Matrices - Networks - Checklists. Importance assessment techniques - cost benefit analysis - analysis of alternatives - methods for Prediction and assessment of impacts - air - water - soil - noise - biological - cultural - social - economic environments. Standards and guidelines for evaluation. Public Participation in environmental decision-making.	9
3	**Environmental Impact Assessment Evaluation**	Trends in EIA practice and evaluation criteria - capacity building for quality assurance, Expert System in EIA - use of regulations and AQM.	8
4	**Environmental Management Plan**	Document planning - collection and organization of relevant information - use of visual display materials – team writing - reminder checklists. Environmental monitoring - guidelines - policies - planning of monitoring programmes. Environmental Management Plan. Post project audit.	8
5	**Case Studies**	Case studies of EIA of developmental projects.	8
Total			**42**

4. Reading

4.1 Textbooks:

1. Khandeshwar, S.R., Raman, N.S., Gajbhiye, A.R., Environmental Impact Assessment, S. R. Khandeshwar N.S. Raman, A.R. Gajbhiye, Dreamtech Press, (2019).
2. Yerramilli, A. Manickam, V., Environmental Impact Assessment Methodologies, BS Publications, 3rd Edition, (2020).

5. Outcome of the Course:

On completion of this course, students will be able to-

1) Know the key steps in the EIA process.
2) Understand the importance of Social Impact Assessments and public participation in the EIA process.
3) Gain an overview of methods and instruments that are commonly used to develop an EIA.

Occupational Health and Industrial Hygiene

1.1 Course Number: FSE305
1.2 Contact Hours:3-0-0 Credits:9
1.3 Semester-offered: 3rd Year –Odd
1.4 Prerequisite: NA
1.5 Syllabus Committee Members: Ms. Ananya Borah & Dr. Nilambar Bariha

2. Objective:

i) Understand the aspects of industrial hygiene and occupational health
ii) Identify occupational health issues and the relevant risk reduction solutions
iii) Gain core skills and knowledge to recognize, evaluate and control hazardous substances in the workplace, encompassing hazards such as chemical, physical (eg noise, radiation), biological and ergonomic agents.

3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-Topic	Lectures
1	**Anatomy, Physiology, Hazard and Pathology**	Definition- Anatomy and Physiology of human organs – The lungs, Skin, Ear, Eyes and skin – Functions of organs – Impairment of organs – Effects of various hazards on organs - Cardio pulmonary resuscitation - audiometric tests, eye tests, vital functional tests. Exposure routes of toxic materials and protective mechanisms, Recognition of health hazards, Methods for measuring and evaluating health hazards.	8
2	**Physical Hazards**	Noise, compensation aspects, noise exposure regulation, properties of sound, occupational damage, risk factors, sound measuring instruments, noise surveys, noise control program, industrial audiometry, hearing conservation programs-vibration, types, effects, instruments, surveying procedure, permissible exposure limit. Ionizing radiation, types, effects, monitoring instruments, control programs, OSHA standard- non-ionizing radiations, effects, types, radar hazards, microwaves and radio waves, lasers, TLV- cold environments, hypothermia, wind chill index, control measures of hot environments, thermal comfort, heat stress indices, Industrial illumination and design of lighting system.	9
3	**Chemical Hazards**	Recognition of chemical hazards-dust, fumes, mist, vapour, fog, gases, types, concentration, Exposure vs. Dose, Field Survey, Sampling methodology, Industrial Hygiene calculations, Comparison with OSHAS Standard. Air Sampling instruments, Types, personal sampling Methods of Control- Engineering Control, Design maintenance considerations, design specifications- General Control Methods - training and education. Toxicology cosmetics– human health risk assessment	9

		and Environmental risk assessment.	
4	**Biological and Ergonomical Hazards**	Classification of Bio-hazardous agents – examples, bacterial agents, viral agents, fungal, parasitic agents, infectious diseases – Biohazard control program, employee health program-laboratory safety program-animal care and handling-biological safety cabinets - building design. Ergonomics-Definition-Role of ergonomics at workplace Work Related Musculoskeletal Disorders	8
5	**Occupational Health, Physiology and Toxicology**	Concept and spectrum of health - functional units and activities of occupational health services, pre-employment and post-employment medical examinations – occupational related diseases, levels of prevention of diseases, notifiable occupational diseases such as silicosis, asbestosis, pneumoconiosis, siderosis, anthracosis, aluminosis and anthrax.	8
Total			**42**

4. Reading

4.1 Reference Books:

1. Fundamentals of Industrial Hygiene, 6th Edition National Safety Council; 6th Edition 2012.
2. Essentials of Industrial Hygiene, 1st Edition National Safety Council, 2015.
3. Barbara, A.P., Quinlan, P.J., MPH, CIH, Villareal, J., Hand book of Fundamentals of Industrial Hygiene, 6th Edition, National Safety Council, 2012.
4. Occupational Health Safety Management Practical Approach, CRC Press Taylor & Francis, 2nd Edition, 2008.
5. Koradecka, D., Handbook of "Occupational Safety and Health", CRC Press, 2010.
6. Fuller, T.P., Handbook of Essentials of industrial hygiene, National Safety Council ItascaIL, 2015.

5. Outcome of the Course:

On completion of this course, the student will be able to:

1) Describe the nature of the health effects associated with exposure to industrial agents
2) Analyze and apply industrial hygiene strategies with respect to chemical, biological, and physical hazards.
3) Identify industrial hygiene standards, testing systems, and monitoring techniques. Recognize, assess, and control chemical, biological, and physical hazards.