CHOICE BASED CREDIT SYSTEM (CBCS) PROGRAM IN

Industrial Environmental, Health & Safety

For Academic Session 2021 -22

Programme Structure

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Curriculum & Scheme of Examination
2021

AMITY UNIVERSITY MADHYA PRADESH GWALIOR

SEMESTER – I
Industrial Environmental, Health & Safety-I

Course Code: CBF 101 **Credit Unit - 3**

Course & Objective:
The goal of this course is to provide students with the scientific and technical background needed to understand environment, health and safety related issues on Industrial perspective. At the end of the course, it is expected that students will be able to understand the various process as well as the phenomena associated with environment, health and safety related issues and would be able to texplore employment opportunities in various industries.

Course Content:
Module –I – Basics of Environment, Health & Safety
Key elements of a safety and Health Management System- Policy & commitment, Planning, Implementation and Operation, Measuring Performance, Auditing and Reviewing performance Initial Safety and health Management System Review, Safety and health Management System model, safety and Health policy- Developing a workplace

Module – II- Safety & Health Policy

Safety and Health Policy , Planning – safety and Health objectives and Targets, performance standards, Implementation and Operation – structure and responsibilities- management responsibilities, individual responsibilities, Safety Consultation.

Module – III – Safety & Health Management
Participation and Representation, Training , Awareness and competence, Communication- Information coming into the organization, Information Flow within the Organization, Information Flow from the Organization,: Document Control : Safety and Health Management System records: Operational Control – Workplace Precautions, Safety And Health training and Competence- Training for Safety and Health:, Identify Training Needs – Organizational Needs, job-related Needs, Individual Needs : Identify Training Objectives and Methods, Deliver Training , Evaluation and feedback, specialist Advice and Services – access to Specialist advice and services, relationships within the Organization , relationships Outside the organization , external specialist safety and safety support.

Examination Scheme

Component	CT	Attendance	Assignment/Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Recommended Books

1. Benny Joseph (2005) Environmental Studies — Tata Mc Graw Hill - Publishers.
2. Rao CS (2006) - Environmental Pollution Control — New Age International Pvt. Ltd Publishers.
3. Manjunath D..L (2007) - Environmental Studies - Pearson Education Publishers.
4. Yaji R.K (2006) - Text Book of Environmental Studies - United Publishers.
5. Centre for Environmental Education (1990) - Essential learning's in Environmental education.
6. Venugopal Rao P (2006) - Principles of Environmental Science and Engineering — Prentice Hall.

SEMESTER - II
Industrial Environmental, Health & Safety-II

Course Code: CBF 201 **Credit Unit - 3**

Course & Objective:

The goal of this course is to provide students with the scientific and technical background needed to understand environment, health and safety related issues on Industrial perspective. At the end of the course, it is expected that students will be able to understand the various process as well as the phenomena associated with environment, health and safety related issues and would be able to explore employment opportunities in various industries.

Course Content:

Module – I- Risk Assessment

Risk assessment and control- the legal Basis for risk Assessment, key stages of Risk assessment and control- use trained Risk assessors, preparation and Inventory, Identify the hazards, assess the risk, identify Appropriate Action, Risk assessment records and control. A simple Risk estimation example – Hazards, remedial measures, Motivation of employees, Insurance coverage of Industrial plant & personnel.

Module II – Plant Safety

Stages in plant life and unsafe condition in factories, maintenance & safety, basics safety programming, safety department, Rules and regulation of safety department, Responsibility of management for safety in plant, safeguarding the public, Responsibility of government, social organization and public authorities. Safety activities of the ILO (International Labour Organization)

Module – III – Social Security

Scope and Importance; need for public awareness about our environment; Economic and social security; Environment impact of transportation and Mining. Role of Government in environment protection, legal aspects of environment protection, NGO initialization, National Committee on environmental Planning (NCP), Environmental Appraisal Committee (EAC), central and state boards for prevention and control of pollution, goals of environment impact policy, case studies,

Examination Scheme

Component	CT	Attendance	Assignment/Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Recommended Books

1. Industrial Safety & Health management; C. Ray Asfal, David W. Rieske; Prentice Hall Publication
2. Industrial Safety, Health Environment & Security; Basudev Panda
3. Safety, Health & Environment Handbook; K.T. Narayanan

SEMESTER - III

Environmental Pollution

Course Code: CBF 301 **Credit Unit - 3**

Course Objective:

The goal of this course is to provide students with the scientific background needed to understand how the pollution affects the environment and human beings. This study addresses will clear the concept of the students about the consequences in the environment due to mismanaged human activities. It is also make clear the treatment process and proper handling of different waste that can cause impact on environment and human health.

Course Content:

Module –I – Air & Noise Pollution

Pollution & Pollutants – Definition, classification of pollutants, type of pollution, causes, effects and control of various types of pollution. Air Pollution – Definition, Classification of Air Pollutants, Classification of sources of air pollution, Major air pollutants and their sources, Particulate matter – Classification and impacts, Effects of air pollutant on Plant, Humans, Building materials and climate, Control of air pollution, techniques for control of particulate emission and gaseous pollutants. Noise pollution – definition, measurement of noise, sources, effects and control of noise pollution.

Module – II- Soil and Water Pollution

Soil Pollution- Definition, sources, effects and control of soil pollution. Water Pollution- Definition, classification – thermal, ground, marine, surface water pollution, sources, effects and control of pollution. Waste water – sewage and industrial waste water. Treatment process of sewage and industrial waste water - Collection & pumping, Screening chamber, Grit chamber, Oil & grease removal, Dissolve air floatation, Biological Treatment : Principal, role of microorganisms in waste water treatment, Stabilization pond, Aerated lagoon, Activated sludge process, Trickling filter, Anaerobic treatment. Eutrophication – causes and effects and control measures

Module – III – Solid & Hazardous Waste Management

Solid waste – Introduction, classification, composition, effects and management. Treatment of various types of municipal solid waste (MSW). Hazardous waste – Introduction, definition, classification, sources of hazardous wastes and its impact on environment and living organisms. Treatment and management of hazardous wastes-transportation, handling and dumping.

Examination Scheme

Component	CT	Attendance	Assignment/Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Recommended Books

1. S. K. Dhameja – Environmental Studies – Kataria & Sons, Delhi
2. P. Meenakshi – Environmental Science & Engineering - PHI learning, Delhi
3. Gerard Kiely – Environmental Engineering – McGraw Hill Publication, New Delhi
4. D.W. Connell – Environmental Chemistry – Lewis Publishers – New York
5. S. E. Manahan – Environmental Chemistry - Lewis Publishers – New York
6. H. Kaur – Environmental Chemistry – Pragati Prakashan, Meerut

SEMESTER IV
Environmental Management & Industrial Safety

Course Code: CBF 401 **Credit Unit - 4**

Course Objective:

To understand environmental issues in general and related industrial sector in particular.To develop the skill for environment management in the industrial sector. To develop environment friendly policy instruments.To develop an expert manpower to handle the complex industrial environment. To give knowledge about occupational health, industrial hygiene, accidental prevention techniques to the students. To make the student aware about safety auditing and management systems pollution prevention techniques etc.

Course Content:

Module –I – Environmental Management

Environmental Impact on Business: Social, Economic, Political, Cultural, Legal and Constitutional sub-systems of environment and their impact on Business. Introduction to Environmental Legislation: How the Parliament functions-Bill to Act to Rules. Introduction to Environmental Acts; Factory Act, Safety Related rules. Environmental Policy of the Government of India for Industrial Location with respect to Ecology. Environmental Policy of the Government of India and the working of the Ministry of Environment and Forests, Central Pollution Control Board, State Pollution Control Boards.

Module – II- Environmental Impact Assessment (EIA) & ISO

EIA: Introduction, Notification 1994 and amendments in current notification. Methodology and process of EIA in India and other countries like UK and USA. ISO – Introduction and classifications; Environmental management System ISO 14000, Environmental Audit: ISO-19011, Qualities of Environmental Auditor, Contents of EA reports, Environmental Audit Terminology,

Module – III – Industrial Safety

Responsibility of employees and employers regarding health and safety - Fire hazards, prevention and precautions - Industrial hazards prevention and protection - Protection from air and noise pollution. General causes and classification of fire, Detection of fire, extinguishing methods, fire fighting installations with and without water. First aid techniques. Industrial ecology, Green chemistry, new technologies – TQM, LCA, PEM, Regulation on occupational safety and health (OSH). Energy utilizations – Heat engines, combined cycle power plants, Heat pumps, geothermal heat pumps, Cogeneration, entropy & chemical energy, fuel cells, Proton exchange membrane (PEM) fuel cell, electricity storage, hydrogen economy, dematerialization.

Examination Scheme

Component	CT	Attendance	Assignment/Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Recommended Books

1. Environmental Impact Assessment by R. K. Jain
2. Rau & Wooten 1987, Environmental Impact Assessment Handbook
3. International Standard ISO-14001 (2004)
4. R.K.Jain and Sunil S.Rao , Industrial Safety , Health and Environment Management Systems, Khanna publishers, New Delhi (2006)
5. Fire Protection And Prevention; By: Brendra Mohan San; Publishers: UBS Publishers & Distributors Pvt Ltd. Edition: 1st Edition; Year of Publication: 2008
6. Hand Book of Fire Technology; By: R.S. Gupta; Publishers: Orient Longman Publishers Edition: Edn-II, 2005
7. Hand Book of Fire And Explosion Protection Engineering; By: Dennis P Nolan; Publishers: Crest Publishing House Edition: 1st Edition; Year of Publication: 2007

SEMESTER – V

Environmental Economics & Disaster Management

Course Code: CBF 501 **Credit Unit - 4**

Course Objective:

The aim of the current subject is to provide students with exact and professional information to economics of the environment. It will help students to develop skills in quantitative analysis and modeling and an understanding of the economic approaches to resolve the challenges of resource over-exploitation and misuse of the environment. To give the students an understanding of the globalization process, the principal mechanisms of international economic connections through which it works and an idea of some of the debates it has evoked.

Course Content:

Module –I – Resource & Environmental Economics

Economics of Exhaustible Resources - Hotelling's rule; Solow-Hartwick's Rule; competitive market structures and optimal extraction policy; monopoly, oligopoly, cartel and other market structures – optimal extraction policy; uncertainty and the rate of resource extraction; exploration and extraction; resource scarcity – indicators, evidence and critique. Economics of Renewable Resources- Characteristics of renewable resources – growth functions and growth rate; economic models of fisheries, economics of optimal harvest cycles of forests; extinction of species, economics of Biodiversity.

Module – II- Energy Economics

Economics of Non-renewable Energy Sources -Economics of coal, petroleum and natural gas; pricing of exhaustible resources; energy prices. Environmental Implications of Energy- Externalities of conventional fuels; health damages due to environmental pollution; economics of pollution control. Renewable Energy Sources and Environment Renewable technologies – solar, wind, geothermal; policies for renewable energy sources

Module – III – Environmental Disasters & Management

Introduction, Definition of Natural disasters – Earthquake, Floods, Tsunami, Drought, Cyclones, Landslides, Avalanches and related case studies. Disaster management strategies – resettlement and rehabilitations

Examination Scheme

Component	CT	Attendance	Assignment/Project/Seminar/Quiz	EE
Weightage (%)	15	5	10	70

Recommended Books

1. Daly, H.E., Beyond Growth: The Economics of Sustainable Development, Beacon Press,
2. Sengupta, R. (2012), Ecological Limits and Economic Development, Oxford University Press, Delhi.
3. Sankar, U. (2001), Environmental Economics, Oxford University Press, Delhi.
4. Chopra, K. and V. Dayal (ed.) (2009), Handbook of Environmental Economics in India, Oxford University Press, Delhi.

SEMESTER – VI

Project Work

Course Code: **CBF 601** **Credit Unit - 1**

Course Objective:

The basic objectives of the course are-

1. To train students on various aspects of Industrial Safety
2. To create safe and sustainable environment by community strengthening capacity building
3. To assist local administration by providing expertise in the field of Health & Safety

Course Content:

Module –I – Project Work

Students are supposed to make a project report based on field work at any Industry to understand Environmental Industrial Health and Safety.

Examination Scheme

Component	Project	Presentation	Viva-voce	Total
Weightage (%)	40	30	30	100