INSTITUTE	**FACULTY OF PHARMACY**
PROGRAM	**MASTER OF PHARMACY (PHARMACEUTICAL QUALITY ASSURANCE)**
SEMESTER	**2**
COURSE TITLE	**HAZARDS AND SAFETY MANAGEMENT**
COURSE CODE	**13MQ0201**
COURSE CREDITS	**4**

Objective:

1 This course is designed to convey the knowledge necessary to understand issues related to different kinds of hazards and their management. Basic theoretical and practical discussions integrate the proficiency to handle the emergency situation in the pharmaceutical product development process and provide a principle-based approach to solving complex tribulations.

Course Outcomes: After completion of this course, student will be able to:

1 Understand basic knowledge about the environment and environmental problems among learners.

2 Ensure
Provide comprehensive knowledge of the safety standards and safety management in the pharmaceutical industry.

3 Empower an idea to clear mechanisms and management in different kinds of hazard management systems

4 Teach the method of Hazard assessment, procedure, and methodology for providing a safe industrial atmosphere.

Pre-requisite of course: Nil

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	75	15	10	0	0

Contents : Unit	Topics	Contact Hours
1	**Unit-1** Multidisciplinary nature of environmental studies: Natural Resources, Renewable and non-renewable resources, Natural resources and associated problems, Forest resources; b) Water resources; c) Mineral resources; d) Energy resources; e) Land resources, Ecosystems: Concept of an ecosystem and Structure and the function of an ecosystem. , Environmental hazards: Hazards based on Air, Water, Soil, and Radioisotopes.	12

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Contents : Unit	Topics	Contact Hours
2	**Unit-2** Air-based hazards: Sources, Types of Hazards, Air circulation maintenance industry for sterile area and non-sterile area, Preliminary Hazard Analysis (PHA) , Fire protection system: Fire prevention, types of fire extinguishers, and critical Hazard management system.	12
3	**Unit-3** Chemical-based hazards: Sources of chemical hazards, Hazards of Organic Synthesis, sulfonating hazard, Organic solvent hazard, Control measures for chemical hazards, Management of combustible gases, Toxic gases and Oxygen displacing gases management, Regulations for chemical hazards, Management of over-Exposure to chemicals and TLV concept.	12
4	**Unit-4** Fire and Explosion: Introduction, Industrial processes and hazards potential, mechanical electrical, thermal and process hazards. Safety and hazards regulations, Fire protection system: Fire prevention, types of fire extinguishers and critical Hazard management system mechanical and chemical explosion, multiphase reactions, transport effects, and global rates. Preventive and protective management from fires and explosion-electricity passivation, ventilation, sprinkling, proofing, relief systems -relief valves, flares, scrubbers.	12
5	**Unit-5** Hazard and risk management: Self-protective measures against workplace hazards. Critical training for risk management, Process of hazard management, ICH guidelines on risk assessment and Risk management methods and Tools Factory act and rules, fundamentals of accident prevention, elements of a safety program and safety management, Physicochemical measurements of effluents, BOD, COD, Determination of some contaminants, Effluent treatment procedure, Role of emergency services.	12
Total Hours		**60**

Textbook :

1 Environmental Science, Y.K. Sing, New Age International Pvt, Publishers, 1990

2 “Quantitative Risk Assessment in Chemical Process Industries”, American Institute of Chemical Industries, Centre for Chemical Process safety., 1997

3 The Biodiversity of India, Bharucha Erach, Mapin Publishing Pvt. Ltd.,, 2000

4 Hazardous Chemicals: Safety Management and Global Regulations, T.S.S. Dikshith, CRC Press, 1990

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	25.00	25.00	15.00	10.00	5.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by the blackboard may also use any tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.

3 Students will use supplementary resources such as online videos, NPTEL videos, MOOCs/ e-courses, virtual laboratories.

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