Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari institute of medical science and Health care
Semester-1

Subject: Laboratory safety and management- PGDMT11504

Type of course: Elective

Prerequisite: Students must know about Hazardous chemical and components and Common laboratory equipments.

Rationale: Students will learn about personal protection equipments and Hazardous chemicals. They also learn about the biosafety against infectious agents. Safety measures for storage of hazardous materials.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Presentation** Students have to prepare a presentation on given topic and upload into moodle.	10
2	**Assignment** Students have to write an assignment on given topic and upload into moodle.	10
3	**Medical training** Students have to upload the attendance of medical training on moodle.	10

4	**Quiz** Faculty will conduct quiz sessions in the classroom per unit of their respective subject and marks will be uploaded to the Moodle.	10
5	**MCQ Test** Faculty will provide the students a set of MCQs according to the learning objective of the course and students will answer it individually on Moodle.	10
Total		**50**

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	**Chapter: 1 Biosafety:** • Introduction; Historical Background. • Introduction to Biological Safety Cabinets and types. • Primary Containment for Biohazards and Biosafety Levels of Specific Microorganisms. • Recommended Biosafety Levels for Infectious Agents and Infected Animals.	15	25
2	**Chapter: 2 Safety Precautions:** • Precautions: Process and operations involving explosives, flammables, toxic substances, dusts, vapors, cloud formation & combating. • Safety precautions for transportation for hazardous chemicals; Handling and storage of hazardous chemicals. • Respiratory personal protective equipment (RPPE) & non respiratory personal protective equipment (NRPPE): head protection, ear protection, face and eye protection, hand protection, foot protection and body protection.	15	25
3	**Chapter: 3 Hazards & Risk identification, Assessment and control techniques:** • Hazards, Risks & detection techniques, Preliminary hazard analysis (PHA) & hazard analysis (HAZAN) • Failure mode effect analysis (FMEA), Hazard and operability (HAZOP) study.	15	25

	• Hazard ranking (DOW & MOND index), Fault tree analysis, Event tree analysis (ETA) • Major accident hazard control, onsite and off-site emergency plans.		
4	**Chapter: 4 Storage hazards** • Safety measures for storage of flammable liquids/solvents, acid and alkali, chlorine and ammonia. • Safety of storing gas cylinders, color coding, marking and ensuring safe connection of cylinder. Design of storage shed or go-down, retention basin, catch pot or dump vessel. Safe placement of containers.	15	25

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks **(Revised Bloom's Taxonomy)**						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Understand toxicology, industrial hygiene, source models, dispersion models, , fires, explosions and its prevention.
CO2	Aware of the factors that can lead to an accident.
CO3	Identify Hazard and risk of the substances present in the lab and its control techniques.
CO4	Conscious about the various strategies and governmental regulations relevant to process safety management.

Instructional Method:

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

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Industrial Hygiene & Chemical Safety - M.H.Fulekar: I. K.International Publishing House,New Delhi.
[2]Fundamentals of Occupational Safety and Health, Mark A. Friend, James P. Kohn,Government Institutes,2010
[3] Handbook of occupational safety and health, Louis J. DiBerardinis, John Wiley, 1999
[4] Industrial Hygiene Evaluation Methods. Micheal S. Bisesi. CRC Press, 2003
[5] Occupational safety management and engineering, Willie Hammer, Dennis Price, PrenticeHall, 2001