MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)
NAAC Accredited with A++ Grade

Name of course: Industrial High Energy Materials, Sensors and Safety (910218)

Proposed By:	Dr. Preeti Gupta
Department:	Applied Science
Credits:	03

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Course Objective: The main objectives of the course will be to inculcate a holistic approach towards safety and hazard management. The course will provide understanding on the safety & hazard management of the toxic chemicals, gases, explosives, safety, hygiene and Eco-friendly effluents disposal etc.

Unit 1 Explosive and Fire retardant

Definition, classification, synthesis and uses of nitrobenzene, TNT, PETN, picric acid, mono and ethylene glycol, glycol dinitrate, nitro-glycerine, nitrocellulose, manitol, RDX, guanidine nitrate, Fire retardants.

Unit 2 Sensors

Sensors: Concept of molecular sensors its properties and applications, Potentiometric sensors, Amperometric sensors, Silicon-based sensors, Theory and applications of calorimetric sensors

Unit 3 Industrial pollution

Industrial pollution: Classification of hazards chemicals, storage, transportation, handling, risk assessments, challenges and solutions

Unit 4 Ecofriendly effluents disposal

Ecofriendly effluents disposal: Water pollutants, health hazards, sampling and analysis of water, water treatment, and different industrial and domestic effluents and their treatment and disposal, advanced waste water treatment, effluent quality standards and laws, chemical industries, tannery, dairy, textile effluents, common treatment.

Unit 5 Industrial hazards, Safety and hygiene

Industrial hazards, Safety**:** Process hazards checklists, hazard surveys, safety program, safety reviews.
Industrial hygiene: Concept, air and biological monitoring, occupational disease, operational control measures, personal protective equipments

Course outcome – Upon successful completion of the course, the student will be able to

CO1 Acquire knowledge of explosive and fire retardant materials.
CO2 Appreciate the concept of molecular sensors its properties and applications.
CO3 Evaluate the hazards chemicals, their storage, transportation, handling, risk assessments etc.
CO4 Explain different industrial and domestic effluents and their treatment and disposal.
CO5 Develope an understanding of chemical safety, fire safety, hazard safety standards and management.

Reference Books: -

1. Chemistry of High-Energy Materials, by Thomas M. Klapötke, De Gruyter, 2012.
2. The Chemistry of Explosives, by Jacqueline Akhavan 2011.
3. Hazardous chemicals Handbook Phylip carson and Clive Mumford Butterworth Heinenann, II edition.
4. Bio sensors fundamentals and application antonyP.F.Turner and George Wilson, Oxford Science Publication.