Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

for

M.Tech.(Health Safety & Environment Engineering)

Semester-III

(Effective from the session: 2022-23)

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH
FACULTY OF ENGINEERING

Faculty of Engineering
Shri Rawatpura Sarkar University, Raipur
M.Tech. (Health Safety & Environment Engineering)
Semester-III
Examination Scheme
(Effective from the session: 2022-23)

S. N	Course Code	Th /Pr	Subject	Type of Course	Teaching hours per week			TC	Examination Scheme				Total Marks
					L	T	P		Theory		Practical		
									EX	IN	EX	IN	
1	MENHS301T	Th	Safety in Engineering Industry	Core	3	1	-	4	70	30	-	-	100
2	MENHS302B	Th	Elective-III	Core	3	1	-	4	70	30	-	-	100
3	MENHS303P	Pr	Preliminary work on dissertation	-	-	-	28	14	-	-	140	60	200
4	MENHS304P	Pr	Seminar based on Dissertation (Synopsis)	-	-	-	4	2	-	-	-	100	100
	Total Contact hr per week: 32			**Total Credit:24**					**Grand Total Marks:**				**500**

L: LECTURE T: TUTORIAL P: PRACTICAL TC: TOTAL CREDIT

Elective-III

S.NO.	Subject Name	Subject Code
1	Hazard & safety measures in process industry	MENHS302A
2	TQM & TPM	MENHS302B
3	Water supply, Refugee Health and Sanitation in Emergency	MENHS302C

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

Course Title	**SAFETY IN ENGINEERING INDUSTRY**				
Course Code	**MENHS301T**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic of industrial management & industrial safety etc				
Course Objectives	**This course will enable students to:** • To provide in-depth knowledge in safety in engineering industry it's applications in various fields. • To provide in-depth knowledge of various processes involved in engineering industry and the associated hazards. • To expose the students to the basics in hazard identification and hazardous process management. • To familiarize the student with occupational hazards associated with various industrial processes.				
Course Contents	**UNIT-I** **Safety in Engineering Industry** HSFS 8002 Safety in Engineering Industry L T P C Version 1.0 3 0 0 3 Pre-requisites/Exposure Basic knowledge of Manufacturing Processes Co-requisites Occupational Safety and Health Management Introduction - definitions - classification of engineering industry - different process in engineering industry. **Unit-II** **Foundry & forging operations** Foundry operations - furnace - health hazard - safe methods of operation. Forging operations - heat radiation - maintenance of machines - final checking of tools, guards, lubrication, shop equipment and hand tools - safe work practice. Operations in hot and cold rolling mills. **Unit-III** **Safety in Press working** Safety in the use of power presses - shearing -bending - rolling - drawing - turning - boring - milling - planning - grinding. Selection and care of tools - health hazards and prevention. **Unit-IV** **Safety in welding** Safety in welding, cutting, finishing, cleaning, polishing, buffing. Safety in heat treatments - safety in handling and storage, disposal of effluents - health precautions, elimination and prevention of long time exposure to the hazardous fumes, source of fumes, ventilation and fume protection.				

	Unit-V **material handling Equipment** Care and maintenance of common elements used in material handling Equipment like rope chains slings, hooks, clamps. General safety consideration in material handling - manual and mechanical handling. Handling assessments - handling techniques – lifting, carrying, pulling, pushing, palletizing and stocking. Occupational diseases due to physical and chemical agents.
Course Outcomes	**After the completion of course:** • Classify engineering industry. • Describe various processes used in engineering industry. • Identify method of operation and hazards involved in foundry operations. • Understand the operations and hazards involved in hot and cold rolling mills. • Understand the operation of power presses, associated hazards and method of safe operation. Identify hazards associated with welding process and method of safe operations. • Describe various aspects of safety in material handling. • Describe and elaborate on various occupational diseases due to physical and chemical agents.
Text Books	1. Som, S C and Biswas, G. "Introduction to fluid mechanics and Fluid Machines" McGraw Hill Publishing Company, New Delhi 2. Young, D. F., Munson, B. R., Okiishi, T. H., & Huebsch, W. W. (2010). A brief introduction to fluid mechanics. John Wiley & Sons.
Reference Books	1. Kumar, D. S. (2015). Fluid Mechanics and Fluid Power Engineering. Katson Books 2. Accident Prevention Manual, 13th Edition, Engineering and Technology-NSC Chicago. 3. ILO Encyclopedia of Occupational Health and Safety - Part XIII, Manufacturing Industries.

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

ELECTIVE-III

Course Title	**HAZARD & SAFETY MEASURES IN PROCESS INDUSTRY**				
Course Code	**MENHS302A**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic knowledge of process industries, Basic mathematic and chemistry.				
Course Objectives	**This course will enable students to:** • To help the students to gain and understand the basic and fundamental Knowledge of Safety precautions and measures to be taken Hydrocarbon industries while drilling, Piping, rigging etc. • To help the students to gain and understand the basic Knowledge Safety & its implications in Work Places with special reference hydrocarbon industry. • To help the students to gain and understand detailed idea about permit to work system and confine space entry procedures and the precaution to be taken while entering and various rules associated with it. • To help the students in finding out the various methods and analyze the types of inspection of industries. • To help the students to gain and understand the basic knowledge about safety and precautionary measures to be taken while receiving, transportation & Storage of hydrocarbons.				
Course Contents	**Unit-I** **Safety measurement** Hazards & Safety Measures in Hydrocarbon Industry Fire, Safety & Health Issues in Hydrocarbon Industry, Health, Safety & Environmental Issues during Drilling & Exploration. **Unit-II** **Safety Aspects** Safety Aspects in Confined Spaces OSHA Guideline for Confined Space Entry, Permit Requirement for Confined Space Entry, Duties of Persons involved in Confined Space Entry. **Unit-III** **Work Permit Systems** Work Permit Systems Cold work permits system, Hot work permit, Confined space work permit, Electrical related work permit. **Unit-IV** **Plant Inspection** Plant Inspection Methods of plant inspections, advantages of plant inspection.				

	Unit-V **storage of hydrocarbons** Receiving and Storage of Hydrocarbon Surface- Storage Types, Safety Features, Layout Design, U/G Aquifers, Caverns, Refrigerated Storage, Standards in Design, Safe Operating and Maintaining Practices. Transportation of Hydrocarbons Rail / Road, Tankers, Pipelines, Barges, Packages.
Course Outcomes	**After the completion of course:** • Gain knowledge and analyze and implementation of Hazards in Process Industries. • Learn various measures and implementation of various methods for mitigating the hazards. Understand and implement safety aspects and confine space entry procedure. • Understand and implement the methods and to implement these in Plant inspection. • Gain Knowledge on various kinds Hazard Identification and Risk Assessment techniques with case studies. • Understand and analyze the methods for safe transportation of Hydrocarbons.
Text Books	1. Industrial Hazards and Safety handbook by Ralph W King and John Magid,1979 2. Chemical Process Safety, 2nd ed, Daniel A. Crowl, Joseph F. Louvar, 2002.
Reference Books	1. Anderson, M G., and Richards, K S Slope Stability.

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

ELECTIVE-III

Course Title	**TQM & TPM**				
Course Code	**MENGE302B**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Quality control, production management etc.				
Course Objectives	**This course will enable students to:** 1. Understand the philosophy and core values of TQM AND TPM. 2. Determine the voice of the customer and the impact of quality on economic performance and long-term business success of an organization 3. Implement appropriate tool/ techniques for improving processes. 4. Apply and evaluate best practices for the attainment of total quality.				
Course Contents	**Unit-I** **Introduction to Total Quality Management** Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, and Customer retention - Costs of quality. **Unit-II** **Juran & Kaizen on Quality** Juran Approach to Quality: Juran,Trilogy, Contributions of Deming, Juran and Crosby Shigeo Shingo, Ishikawa Meaning Kaizen –Innovation, Kaizen Management Practices, TQC. **Unit-III** **Tools and Technique** Supporting Tools and Technique in TQM. The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types. Control Charts - Process Capability - Quality Function Development (QFD) - Taguchi quality loss function. **Unit-IV** **ISO 9000 Series Quality Standard** Need for ISO 9000 - ISO 9001-2015 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors Total Productive Maintenance. Introduction of TPM, Eight Pillars of TPM, Six big losses, Traditional model of TPM, Overall equipment efficiency (OEE) and its calculation				

	Unit-V **Case Studies** Changing Company Culture; Xerox Corporation – Using TQM as a Competitive Strategy; Motorola's Secret to TQC; Motorola's Quest for Quality.
Course Outcomes	The students will be able to: • Understand the fundamental principles of TQM and TPM. • Choose appropriate tool/ techniques for improving processes. • Write reports to management describing processes and recommending ways to improve them. • Develop research skills that will allow them to keep abreast of changes in the field of TQM/TPM. • Emphasis the process of learning and discovery rather than the presentation of fact.
Text Books	1. Evans, J. R., Dean J. W. Total quality management, organization and strategy, Thomson, 2003. 399 p. 3. 2. Kanji G. K., Asher M. 100 Methods for Total Quality Management. London: SAGE Publications, 1996. 3. Oakland G. F. Total Quality Management, Oxford, 1995. 4. Goetsch D. L., Davis S. B. Quality management. Introduction to TQM for production, processing and services. New Jersey: Prentice Hall, 2003. Longman Publishers. ISBN: 9780582285972.
Reference Books	1. Besterfield, DH, et.al. 2003, Total Quality Management, 3rd edn, Prentice Hall. 2. Goetsch, DL & Davis, B 2006, Quality Management: Introduction to Total Quality. Management for Production, Processing and Services, 5th edn, Pearson. 3. Gryna FM 2001, Quality Planning & Analysis, 4th edn, Jr., McGraw-Hill.

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

ELECTIVE-III

Course Title	**WATER SUPPLY, REFUGEE HEALTH AND SANITATION IN EMERGENCY**				
Course Code	**MENHS302C**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic Knowledge of water supply Engineering, Basic knowledge of waste water treatment &Basic knowledge of Global disaster and their causes.				
Course Objectives	**This course will enable students to:** • Explain the relationship between the environment and water, sanitation and hygiene related diseases. • Present standards and key indicators related water supply, sanitation and hygiene in emergencies. • To provide basic information about control measures for improving environmental conditions. Discuss the importance of addressing long term needs of the community at the onset of the emergency and throughout its duration.				
Course Contents	**Unit-I** **Emergency Management** Hazards Monitoring and Emergency Management Tracking and modeling – early warning systems – warning protocols – India disaster resource network – environmental hazards – public health aspects of disaster management – emergency services systems - urban hazards and disasters – an introduction to disaster planning. Introduction to emergency management planning - organization and structure for emergency management- emergency management research – methods/analysis – public information for emergency management – principles and practice for disaster relief and recovery – logistics, support system – computer applications in emergency management. **Unit-II** **Humanitarian Laws** Humanitarian Interventions, Human rights, international humanitarian law and refugee conventions, guidelines on internally displaced persons, public health surveillance, control of communicable and non-communicable Partnerships and roles in different stages of emergencies, e.g. humanitarian reform, role of national governmental and non-governmental actors, community participation, prevention/recovery strategies, diseases, mental health, reproductive health, violence and injuries, water and sanitation, nutrition, refugee camp planning. **Unit-III** **Environmental Health Risks**, Site Selection & Planning Introduction – environmental health risks in emergencies – needs and standards – public health approach to water supply and sanitation in emergencies – partners in the humanitarian response – working with disaster affected people – social diversity – local context Emergency settlements, site selection and				

	planning – introduction – physical planning of emergency settlement – settlement location and physical layout: implications for water supply and sanitation. **Unit-IV** **Water Supply & Drainage** Water supply – planning and implementation – water sources – treatment – pumping – tinkering – storage – distribution – collection and use – testing. Waste water – storm water – community involvement. **Unit-V** **Excreta Disposal & solid waste** Excreta Disposal Phased response – organizational options – staffing needs – monitoring latrine programmers – technical options – options for problem sites Health risk of solid waste from health centers – dead bodies.
Course Outcomes	**After the completion of course:** • To explain the relationship between the environment and water, sanitation and hygiene related diseases. • To follow standards and key indicators related water supply, sanitation and hygiene in emergencies. • To design Soak pit, Infiltration trench, Evaporation pan for Waste water management. • To discuss the importance of addressing long term needs of the community at the onset of the emergency and throughout its duration. • To identify and control problems in the environment, water, sanitation and hygiene situation during an emergency. • To apply standards to water supply, sanitation and hygiene in emergencies.
Text Books	1. Harvey, P.A., Baghri, S. and Reed, R.A. (2002) Emergency Sanitation: Assessment and programme design, WEDC, Loughborough University, UK. 2. Adams, John Managing Water Supply and Sanitation in Emergencies. Oxfam: Oxford.
Reference Books	1. Assar, M. Guide to sanitation in Natural disasters. 2. House, Sarah and Reed, Bob Emergency Water Sources: Guidelines for selection and treatment. WEDC, Loughborough University: Loughborough.

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

Course Title	**PRELIMINARY WORK ON DISSERTATION**				
Course Code	**MENGE303P**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**28**	**14**	
Prerequisites	Project works in under graduates				
Course Objectives	**This course will enable students to:** • Describe the research process. • Outline the elements of a thesis/dissertation. • Select a research topic of importance to the profession. • Effectively work with their academic advisor and graduate committee. • Develop and follow an appropriate timeline for completion of the thesis/dissertation. • Identify an appropriate theory base for their research. • Develop a conceptual model relevant to their research.				
Course Contents	1. Each student will select a topic in the area of health safety engineering and related area in the state of art area & technical development. 2. The topic will be decided by the Student, Guide and Departmental research committee. 3. Each student will make seminar presentation with audio/video aids, for the duration of 45 minutes and seminar work shall be in form of report to be submitted by the students at the end of the semester. 4. This report copies must be duly signed by guide and Head of Department. Attendance of all students for all seminars is compulsory. 5. Define the statement of research problem 6. Literature survey, familiarity with research journals 7. Broad knowledge off the available techniques to solve the problems 8. Technical writing skills 9. Presentation skills				
Course Outcomes	**After the completion of course:** • Acceptable with minor or no revisions (no further approval required) • Acceptable with major revisions in content or format not acceptable				
Reference Books	1. Student will learn to survey the relevant literature such as books, national/international referred journals and contact resource persons for the selected topic of research.				

	2. Roberts, C. M. (2010). The dissertation journey. Thousand Oaks, CA: Corwin.

M.Tech. (Heath Safety & Environment Engineering)
Semester-III
2022-23

Course Title	**PREDISSERTATION (LITERATURE REVIEW/ PROBLEM FORMULATION/ SYNOPSIS)**				
Course Code	**MENHS304P**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**4**	**2**	
Prerequisites	Project work in under graduates etc				
Course Objectives	**This course will enable students to:** • Demonstrate the skills for good presentation and technical report writing skills. • Apply engineering and management principles while executing the project.				
Course Contents	1. Each student will select a topic in the area of geo-tech engineering and related area in the state of art area & technical development. 2. Every student will carry out dissertation under the supervision of a Supervisor. 3. The topic shall be approved by a committee constituted by the Head of the concerned department. 4. Every student will be required to present two seminar talks, First at the beginning of the Dissertation (Phase-I)to present the scope of the work and to finalize the topic, and second towards the end of the semester, presenting the work carried out by him/her in the semester. 5. The committee constituted will screen both the presentations and work. 6. Define the statement of research problem 7. Literature survey, familiarity with research journals 8. Broad knowledge off the available techniques to solve the problems 9. Technical writing skills 10. Presentation skills				
Course Outcomes	**After the completion of course:** • Student will learn to survey the relevant literature such as books, national/international referred journals and contact resource persons for the selected topic of research. • Students will be able to use different experimental techniques. • Students will be able to use different software/computational/analytical tools. • Students will be able to design and develop an experimental set up/equipment/test rig. • Students will be able to conduct tests on existing set ups/equipments and draw logical conclusions from the results after analyzing them. • Students will be able to either work in a research environment or in an industrial environment.				

Reference Books	1. Student will learn to survey the relevant literature such as books, national/international referred journals and contact resource persons for the selected topic of research. 2. Roberts, C. M. (2010). The dissertation journey. Thousand Oaks, CA: Corwin.