

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	OMED612	Industrial Safety engineering	3	0	0	3

Course Objective

1. Impart knowledge on engineering systems safety facets, tools, techniques, and methodologies.
2. Focus on preventing unsafe operations and accidents in various industrial settings.
3. Develop skills in safety analysis, hazard identification, and risk assessment methods.
4. Teach integration of safety with operational goals like quality and reliability.
5. Cover safety design principles, control measures, and regulatory compliance standards.

Learning Outcomes

1. Students will understand concepts and dimensions of engineering systems safety.
2. Students will apply safety design and analysis mathematics to engineering problems.
3. Students will design systems with inherent safety features and control mechanisms.
4. Students will integrate safety considerations with quality and reliability objectives.
5. Students will evaluate and mitigate risks in industrial operations using established tools.

Unit No.	Topics to be Covered	lecture Hours	Video time (Minutes)	Learning Outcome
1.	Introduction, key concepts, terminologies, and safety quantification, safety by design	5	197	Key terminology in Safety
2.	Hazard identification techniques (e.g., HAZOP, FMEA, etc.))	5	220	Hazard identification techniques
3.	Fault tree and event tree analysis (qualitative & quantitative)	5	190	Fault tree Analysis
4.	Bow-tie and quantitative risk assessment (QRA)	5	176	Quantitative risk assessment
5.	Safety function deployment	5	187	Safety function deployment
6.	Safety vs reliability – quantification of basic events (repair to failure, repair-failure-repair, and combined processes)	5	145	Safety vs reliability
7.	Safety vs reliability – quantification of basic events (contd.)	5	182	Safety vs reliability
8.	Systems safety quantification (e.g., truth tables, structure functions, minimal cut sets)	5	183	Systems safety quantification
9.	Human error analysis and safety	5	189	Human error analysis
10.	Accident investigation and analysis	5	228	Accident investigation
11.	Application of virtual reality	5	150	Application of VR
12.	OSHAS 18001 and OSHMS	5	106	OSHAS 18001 and OSHMS
Total		50	2153	

Text Books:

1. Probabilistic Risk Assessment for Engineering and Scientists, Komamoto and Henley, IEEE Press, 1995.
2. Industrial Accident Prevention, Heinrich et al., McGraw Hill, 1980.

Reference Books:

1. Techniques for safety management - A systems approach, Petersen D, ASSE 1998.