

# M.E. - INDUSTRIAL SAFETY AND ENGINEERING

## Curriculum & Syllabus for Semester I and II

**REGULATIONS 2024**  
**(Academic Year 2024-25 Onwards)**







**K.S.R. COLLEGE OF ENGINEERING : TIRUCHENGODE - 637 215**  
**(Autonomous)**  
**INDUSTRIAL SAFETY ENGINEERING**

**(REGULATIONS 2024)**

**Vision of the Institution**

**IV** We envision to achieve status as an excellent educational institution in the global knowledge hub, making self-learners, experts, ethical and responsible engineers, technologists, scientists, managers, administrators and entrepreneurs who will significantly contribute to research and environment friendly sustainable growth of the nation and the world.

**Mission of the Institution**

**IM 1** To inculcate in the students self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, administrators and entrepreneurs by diligently imparting the best of education, nurturing environmental and social needs.

**IM 2** To foster and maintain mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research and innovation.

**Vision of the Department / Programme: (Industrial Safety Engineering)**

**DV** To be a centre of excellence in the field of Mechanical Engineering for providing its students and faculty with opportunities for excel in education and targeted research themes in emerging areas.

**Mission of the Department / Programme: (Industrial Safety Engineering)**

**DM 1** To excel in academic and research activities that meet the industrial and social needs.

**DM 2** To develop competent, innovative and ethical mechanical Engineers.

**Programme Educational Objectives (PEOs) :( Industrial Safety Engineering)**

**The graduates of the programme will be able to**

**PEO 1** Enhance the skills and knowledge on safety, health and environment with respect to industry and research, for executing safe methods in complex engineering problems.

**PEO 2** Understand the impact of safety, health and environmental solutions on productivity, quality and societal at large.

**PEO 3** To comply with legal safety, ethical and contractual requirements, professional practices to contribute the community for the sustainable development of society.



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**INDUSTRIAL SAFETY ENGINEERING**


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**PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs)**

<b>Programme Outcomes (POs)</b>	
<b>PO1</b>	An ability to independently carry out research / investigation and development work to solve practical problems.
<b>PO2</b>	An ability to write and present a substantial technical report / document.
<b>PO3</b>	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be a level higher than the requirements in the appropriate bachelor program.
<b>PO4</b>	An ability to attain, identify and apply knowledge of mathematics, soft computing & soft skill and management for various academic and industrial needs.
<b>Programme Specific Outcomes (PSOs)</b>	
<b>PSO1</b>	Students should be able to use techniques and modern engineering tools for engineering practices in their immediate employment and/or entrepreneurial activities.
<b>PSO2</b>	Contribute to the core universal human values and social good to community with respect to industrial safety, health and environment.

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<b>Department</b>		<b>Department of Mechanical Engineering</b>									
<b>Programme</b>		<b>M.E. Industrial Safety Engineering</b>									
<b>SEMESTER I</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>Induction Programme</b>			-	-	-	-	-	-	-	-	-
<b>THEORY COURSES</b>											
1	MA24T13	Applied Statistics	FC	3	0	0	3	3	40	60	100
2	IS24T11	Principles of Safety Management	PCC	3	0	0	3	3	40	60	100
3	IS24T12	Environmental Safety	PCC	3	0	0	3	3	40	60	100
4	IS24T13	Industrial Safety, Health and Environment (SHE) Acts	PCC	3	0	0	3	3	40	60	100
5		Professional Elective – I	PEC	3	0	0	3	3	40	60	100
6		Professional Elective – II	PEC	3	0	0	3	3	40	60	100
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>											
7	IS24P11	Technical Presentation - I	EEC	0	0	3	3	2	60	40	100
<b>TOTAL</b>				<b>18</b>	<b>0</b>	<b>3</b>	<b>21</b>	<b>20</b>	<b>700</b>		
<b>SEMESTER II</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1	RM24T19	Research Methodology and IPR	RMC	3	0	0	3	3	40	60	100
2	IS24T21	Fire Engineering and Explosion Control	PCC	3	0	0	3	3	40	60	100
3	IS24T22	Electrical Safety	PCC	3	0	0	3	3	40	60	100
4	IS24T23	Occupational Health and Industrial Hygiene	PCC	3	0	0	3	3	40	60	100
5		Professional Elective – III	PEC	3	0	0	3	3	40	60	100
6		Professional Elective – IV	PEC	3	0	0	3	3	40	60	100
<b>LABORATORY COURSES</b>											
7	IS24P21	Industrial Safety Laboratory	PCC	0	0	3	3	2	60	40	100
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>											
8	IS24P22	Technical Presentation - II	EEC	0	0	3	3	2	60	40	100
<b>TOTAL</b>				<b>18</b>	<b>0</b>	<b>6</b>	<b>24</b>	<b>22</b>	<b>800</b>		

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Department		Department of Mechanical Engineering									
Programme		M.E. Industrial Safety Engineering									
SEMESTER III											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>THEORY COURSES</b>											
1	IS24T31	Human Factors Engineering	PCC	3	0	0	3	3	40	60	100
2		Professional Elective – V	PEC	3	0	0	3	3	40	60	100
3		Open Elective	OEC	3	0	0	3	3	40	60	100
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>											
4	IS24P31	Project work Phase - I	EEC	0	0	12	12	6	60	40	100
5	IS24P32	Internship *	EEC	0	0	12	12	6	100	-	100
<b>AUDIT COURSES</b>											
6		Audit course	AC	2	0	0	2	0	100	-	100
<b>TOTAL</b>				<b>11</b>	<b>0</b>	<b>24</b>	<b>35</b>	<b>21</b>	<b>600</b>		
* - Students should undergo internship during the II semester summer vacation											
SEMESTER IV											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>EMPLOYABILITY ENHANCEMENT COURSES</b>											
1	IS24P41	Project work Phase - II	EEC	0	0	24	24	12	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>100</b>		
<b>TOTAL CREDITS</b>								<b>75</b>			
<b>TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 75</b>											
<b>Note:</b> FC - Foundation Courses, PCC - Professional core courses, PEC- Professional Elective courses, EEC - Employability Enhancement Courses and AC- Audit courses.											

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<b>Department</b>		<b>Department of Mechanical Engineering</b>									
<b>Programme</b>		<b>M.E. Industrial Safety Engineering</b>									
<b>FOUNDATION COURSES (FC)</b>											
<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Semester</b>	<b>Periods / Week</b>				<b>Credit</b>	<b>Max. Marks</b>		
				<b>L</b>	<b>T</b>	<b>P</b>	<b>Tot</b>		<b>CA</b>	<b>ES</b>	<b>Tot</b>
1	MA24T13	Applied Statistics	I	3	0	0	3	3	40	60	100
<b>TOTAL</b>				<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>			
<b>PROFESSIONAL CORE COURSES (PCC)</b>											
<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Semester</b>	<b>Periods / Week</b>				<b>Credit</b>	<b>Max. Marks</b>		
				<b>L</b>	<b>T</b>	<b>P</b>	<b>Tot</b>		<b>CA</b>	<b>ES</b>	<b>Tot</b>
1	IS24T11	Principles of Safety Management	I	3	0	0	3	3	40	60	100
2	IS24T12	Environmental Safety	I	3	0	0	3	3	40	60	100
3	IS24T13	Industrial Safety, Health and Environment (SHE) Acts	I	3	0	0	3	3	40	60	100
4	IS24T21	Fire Engineering and Explosion Control	II	3	0	0	3	3	40	60	100
5	IS24T22	Electrical Safety	II	3	0	0	3	3	40	60	100
6	IS24T23	Occupational Health and Industrial Hygiene	II	3	0	0	3	3	40	60	100
7	IS24P21	Industrial Safety Laboratory	II	0	0	3	3	2	60	40	100
8	IS24T31	Human Factors Engineering	III	3	0	0	3	3	40	60	100
<b>TOTAL</b>				<b>21</b>	<b>0</b>	<b>3</b>	<b>24</b>	<b>23</b>	<b>800</b>		
<b>EMPLOYABILITY ENHANCEMENT COURSES (EEC)</b>											
<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Semester</b>	<b>Periods / Week</b>				<b>Credit</b>	<b>Max. Marks</b>		
				<b>L</b>	<b>T</b>	<b>P</b>	<b>Tot</b>		<b>CA</b>	<b>ES</b>	<b>Tot</b>
1	IS24P11	Technical Presentation - I	I	0	0	3	3	2	60	40	100
2	IS24P22	Technical Presentation - II	II	0	0	3	3	2	60	40	100
3	IS24P31	Project work Phase - I	III	0	0	12	12	6	60	40	100
4	IS24P32	Internship *	III	0	0	12	12	6	100	-	100
5	IS24P41	Project work Phase - II	IV	0	0	24	24	12	60	40	100
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>54</b>	<b>54</b>	<b>28</b>			

PROFESSIONAL ELECTIVE COURSES (PEC)											
PROFESSIONAL ELECTIVES – I and II (SEMESTER – I)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	IS24E01	Safety in Construction	I	3	0	0	3	3	40	60	100
2	IS24E02	Dock Safety	I	3	0	0	3	3	40	60	100
3	IS24E03	Artificial Intelligence and Expert systems	I	3	0	0	3	3	40	60	100
4	IS24E04	Plant Layout and Materials Handling	I	3	0	0	3	3	40	60	100
5	IS24E05	Additive Manufacturing	I	3	0	0	3	3	40	60	100
6	IS24E06	Advanced Materials	I	3	0	0	3	3	40	60	100
7	IS24E07	Safety in Mines	I	3	0	0	3	3	40	60	100
8	IS24E08	Fireworks safety	I	3	0	0	3	3	40	60	100
9	IS24E09	Welding Economics, Management and Safety	I	3	0	0	3	3	40	60	100
10	IS24E10	Food Processing, Preservation and Transport	I	3	0	0	3	3	40	60	100
PROFESSIONAL ELECTIVES – III and IV (SEMESTER – II)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	IS24E11	OHSAS18001 and ISO14001	II	3	0	0	3	3	40	60	100
2	IS24E12	Safety in Chemical Industries	II	3	0	0	3	3	40	60	100
3	IS24E13	Non Destructive Testing and Evaluation	II	3	0	0	3	3	40	60	100
4	IS24E14	Reliability Engineering	II	3	0	0	3	3	40	60	100
5	IS24E15	Optimization Techniques in Manufacturing	II	3	0	0	3	3	40	60	100
6	IS24E16	Quality Engineering	II	3	0	0	3	3	40	60	100
7	IS24E17	Computer Aided Hazard Analysis	II	3	0	0	3	3	40	60	100
8	IS24E18	Advanced Metrology and Non Destructive Testing	II	3	0	0	3	3	40	60	100
9	IS24E19	Safety in Engineering Industry	II	3	0	0	3	3	40	60	100
10	IS24E20	Materials Testing and Characterization Techniques	II	3	0	0	3	3	40	60	100
PROFESSIONAL ELECTIVES – V (SEMESTER – III)											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	IS24E21	Work Study and Ergonomics	III	3	0	0	3	3	40	60	100
2	IS24E22	Safety in Powder Handling	III	3	0	0	3	3	40	60	100
3	IS24E23	Nuclear Engineering and Safety	III	3	0	0	3	3	40	60	100
4	IS24E24	Safety in Textile Industry	III	3	0	0	3	3	40	60	100
5	IS24E25	Transport Safety	III	3	0	0	3	3	40	60	100



6	IS24E26	Energy Conservation and Management	III	3	0	0	3	3	40	60	100
7	IS24E27	Plastics and Composite Materials	III	3	0	0	3	3	40	60	100
<b>AUDIT COURSES (SEMESTER – III)</b>											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	AX24A01	Disaster Management	III	2	0	0	2	0	100	-	100
2	AX24A02	Value Education	III	2	0	0	2	0	100	-	100
3	AX24A03	Constitution of India	III	2	0	0	2	0	100	-	100
4	AX24A04	Indian Knowledge System	III	2	0	0	2	0	100	-	100
<b>RESEARCH METHODOLOGY COURSE (RMC)</b>											
S. No.	Course Code	Course Title	Semester	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	RM24T19	Research Methodology and IPR	II	3	0	0	3	3	40	60	100
<b>OPEN ELECTIVE COURSES</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
<b>COMPUTER SCIENCE AND ENGINEERING</b>											
1	CS24O01	Machine learning and Deep Learning	OEC	3	0	0	3	3	40	60	100
2	CS24O02	Blockchain and Crypto Currency	OEC	3	0	0	3	3	40	60	100
3	CS24O03	Multimedia Technologies	OEC	3	0	0	3	3	40	60	100
<b>BIG DATA ANALYTICS</b>											
4	BD24O01	Big Data Analytics	OEC	3	0	0	3	3	40	60	100
5	BD24O02	Internet of Things and Cloud	OEC	3	0	0	3	3	40	60	100
6	BD24O03	Big Data Visualization	OEC	3	0	0	3	3	40	60	100
<b>POWER ELECTRONICS AND DRIVE</b>											
7	PE24O01	Switching Concepts and Power	OEC	3	0	0	3	3	40	60	100
8	PE24O02	Smart Grid Technology	OEC	3	0	0	3	3	40	60	100
9	PE24O03	Renewable Energy Technology	OEC	3	0	0	3	3	40	60	100
10	PE24O04	Energy Management and Conservation	OEC	3	0	0	3	3	40	60	100
<b>EMBEDDED SYSTEMS TECHNOLOGY</b>											
11	ET24O01	Embedded Systems	OEC	3	0	0	3	3	40	60	100
12	ET24O02	Embedded Control	OEC	3	0	0	3	3	40	60	100
13	ET24O03	Embedded Automation	OEC	3	0	0	3	3	40	60	100
<b>INFORMATION TECHNOLOGY</b>											
14	IT24O01	IoT for Smart System	OEC	3	0	0	3	3	40	60	100
15	IT24O02	Machine Learning for Intelligent	OEC	3	0	0	3	3	40	60	100
16	IT24O03	DevOps and Microservices	OEC	3	0	0	3	3	40	60	100

17	IT24004	Cyber security and Digital Awareness	OEC	3	0	0	3	3	40	60	100
<b>CONSTRUCTION ENGINEERING AND MANAGEMENT</b>											
18	CN24001	Energy Efficient Building	OEC	3	0	0	3	3	40	60	100
19	CN24002	Economics and Finance management	OEC	3	0	0	3	3	40	60	100
20	CN24003	Stress management	OEC	3	0	0	3	3	40	60	100
<b>STRUCTURAL ENGINEERING</b>											
21	ST24001	Principles of Sustainable	OEC	3	0	0	3	3	40	60	100
22	ST24002	Failure Analysis of Structures	OEC	3	0	0	3	3	40	60	100
23	ST24003	Smart materials and Smart Structures	OEC	3	0	0	3	3	40	60	100
<b>COMMUNICATION SYSTEMS</b>											
24	CU24001	Principles of Multimedia	OEC	3	0	0	3	3	40	60	100
25	CU24002	Software Defined Radio	OEC	3	0	0	3	3	40	60	100
26	CU24003	MEMS & NEMS	OEC	3	0	0	3	3	40	60	100
27	CU24004	Introduction to cognitive Radio Network	OEC	3	0	0	3	3	40	60	100
<b>CAD/CAM</b>											
28	CC24001	Digital Manufacturing	OEC	3	0	0	3	3	40	60	100
29	CC24002	Design for Manufacturing and Assembly	OEC	3	0	0	3	3	40	60	100
30	CC24003	Smart Materials and Structures	OEC	3	0	0	3	3	40	60	100
<b>OPEN ELECTIVE COURSES OFFERED BY INDUSTRIAL SAFETY ENGINEERING</b>											
S. No.	Course Code	Course Title	Category	Periods / Week				Credit	Max. Marks		
				L	T	P	Tot		CA	ES	Tot
1	IS24001	Industrial Safety Engineering	OEC	3	0	0	3	3	40	60	100
2	IS24002	Fire Engineering and Protection	OEC	3	0	0	3	3	40	60	100
3	IS24003	Food and Bio-safety	OEC	3	0	0	3	3	40	60	100

Summary						
Name of the Programme: M.E Industrial Safety Engineering						
CATEGORY	I	II	III	IV	TOTAL CREDITS	%
FC	3				3	04.00
PCC	9	11	3		23	30.66
PEC	6	6	3		15	20.00
OEC			3		3	04.00
EEC	2	2	12	12	28	37.33
AC			✓			-
RMC		3			3	04.00
<b>Total</b>	<b>20</b>	<b>22</b>	<b>21</b>	<b>12</b>	<b>75</b>	<b>100</b>