SEMESTER S8

ERGONOMICS

Course Code	PEMRT864	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None/ (Course code)	Course Type	Theory

Course Objectives:

1. Equip students with the knowledge and skills to design ergonomic workspaces that reduce the risk of musculoskeletal disorders, improve posture, and ensure physical well-being by understanding human anatomy, anthropometry, and biomechanics.
2. Enable students to design optimal lighting, acoustic, and visual environments to minimize visual fatigue, eye strain, and auditory discomfort, while improving overall comfort and productivity in various work settings.

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SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Humanise work, Basis Body Mechanics, Anatomy of Spine and Pelvis for postures, Stability and Postural Adaptation, Musculoskeletal Disorders in Work Spaces, Behavioural Aspects of Postures, Sources of Human Variability, Principles of Applied Anthropometry, Application of Anthropometry in Design, Design for Everyone, Personal Space.	9
2	Design of Standing and Sitting, Workstation Design, Work Surface Design, Visual Display Units, Guidelines for Design of Static and Repetitive Works, Ergonomic Interventions, Handle Design, Keyboard Design, Anatomy and Biomechanics of Manual Handling, Prevention of Injuries in Manual Handling, Design of Manual Handling Task, Carrying.	9
3	Muscle Structure - Function and Capacity, Factors Affecting Physical Work Capacity, Applied Physiology in Work Space, Measurement of	9

	Physiological Cost of Work, Comfort and the Indoor Climate, Protection Against Extreme Climates.	
4	Eye Vision, Measurement of Light, Lighting Design Consideration, Visual Fatigue, Eye Strain and Near Work, Indoor Lighting – Psychological Aspects, Measurement of Sound, Ear Protection, Design of Acoustic Environment, Industrial Noise Control, Design of Visual Displays, Design of Audio Displays, Design of Controls, Combining Displays and Controls, Virtual Environment.	**9**

Course Assessment Method

(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand how to design workspaces that reduce musculoskeletal disorders and enhance productivity.	**K2**
CO2	Understand principles for creating effective and comfortable standing, sitting, and manual handling workstations.	**K2**
CO3	Understand how to optimize lighting, acoustics, and visual environments to minimize fatigue and discomfort.	**K2**
CO4	Understand how to measure physiological work costs and design workspaces that ensure comfort and accommodate diverse human needs.	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2									3
CO2	3	3	2									3
CO3	3	3	2									3
CO4	3	3	2									3

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Introduction to human factors and ergonomics	R.S Bridger	CRC Press Tylor and Francis group	4th edition, 2018
2	ERGONOMICS in the Automotive Design Process	Vivek D. Bhise	CRC press Tylor and francis group	2nd edition, 2024

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Human factors method for improving performance in the process industries	Dennis Attwood , et.al	John wiley and sons Inc. Publications	2006
2	A guide to human factors and ergonomics	Martin Helander	CRC press Tylor and francis group	2nd edition, 2005

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