SEMESTER: S7

ERGONOMICS

Course Code	PEPET744	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 Type	Theory

Course Objectives:

1. To familiarise the concepts of ergonomics, work induced stress and fatigue.
2. To enable the students to apply the concepts of work environment and workplace design in industries.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Ergonomics: Introduction, understanding of ergo-system, fitting task to man their contractual structure, humanise work, basic 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	Work induced stress and fatigue: 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, muscle structure - function and capacity, factors affecting physical work capacity.	9
3	Work environment and their interactions: Eye Vision, measurement of light, lighting design consideration, design of visual displays, 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

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4	Applied physiology in work space: Measurement of physiological cost of work, indoor climate, protection against extreme climates. Human error and equipment design, mental workload in human machine interaction, characteristics of human machine interaction, prevention of human error, human computer interaction, human centred design process for interactive systems, human computer dialogue, system design methods for ergonomics, cross cultural considerations.	**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 = 24 marks)**	• 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 subdivisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

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

Course Outcomes		Bloom's Knowledge Level (KL)
CO1	Interpret ergonomics and principles of anthropometry.	**K2**
CO2	Explain work induced stress and fatigue.	**K2**
CO3	Apply the work environment and their interactions in workplace design.	**K3**
CO4	Demonstrate the work physiology and its application in work places.	**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)

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

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

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Introduction to Ergonomics	Bridger R S	McGraw Hill	1st Ed., 1995
2	Human Factors in Engineering and Design	McCormick J	McGraw Hill	1st Ed., 1992

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Human Factors in Product Design	Green W S and Jordan P W	Taylor & Francis	1st Ed., 2019
2	A Guide to Human Factors and Ergonomics	Martin Helander	CRC Press	2nd Ed.2005
3	Ergonomic Workplace Design for Health, Wellness, and Productivity	Alan Hedge	CRC Press	1st Ed., 2016

Video Links (NPTEL, SWAYAM…)	
Link ID	https://archive.nptel.ac.in/courses/112/104/112104222/

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