

**DISCIPLINE SPECIFIC ELECTIVE COURSE
DSE HP 7E1: ERGONOMIC DESIGN**

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course(if any)
		Lecture	Tutorial	Practical/ Practice		
Ergonomic Design DSE HP 7E1	4	2	0	2	Class XII	Studied Space Planning & Sustainability DSC HP 513

Learning Objectives

- To sensitize the students towards the importance of ergonomics and its application in daily life
- To understand components of worker inputs
- To develop understanding of functional design and arrangement of workplaces and equipment
- To identify human and workplace factors which contribute to ergonomic hazards
- To develop aptitude in identifying the product / space design problems at place of work

Learning Outcomes

The students would be able to

- Understand the concept, history and importance of ergonomics in designing.
- Recognize and appreciate the scope of ergonomics in the professional arena
- Develop skills in taking anthropometric measurements as applied to different work stations.
- Apprehend the techniques of conducting time & motion and energy studies.
- Critically evaluate and design different workstations & equipment with respect to their functional effectiveness.

SYLLABUS OF DSE HP 7E1

**THEORY
(Credits 2; Hours 30)**

UNIT I: Introduction to Human Factors and Ergonomics

8 Hours

This unit introduces the students to the concept of ergonomics and anthropometry and their importance in daily life.

- Ergonomics- concept, significance, history, application of Ergonomics in daily life
- Anthropometry – History and its application in interior designing for different work areas and workers
- Human-Centred Design- Design Thinking concept and methodology

UNIT II: The User Component

6 Hours

This unit highlights the importance of various components of worker inputs

- Physical: Bio-mechanics of human movement and musculo-skeletal system, Anatomical position, reference planes and movements
- Temporal
- Cognitive
- Affective

UNIT III: Workplace Design

12 Hours

This unit focuses on the functional design of workplaces, work study techniques, indices of indoor comfort, man- machine interface, as well as the occupational safety and health at the workplace.

- Functional design and arrangement of workplaces
- Work study- Time and motion study, energy study
- Indices of indoor comfort: ventilation, lighting, temperature, noise
- Human Machine Interface- Controls and Displays

UNIT IV: Risk factors in Ergonomics

4 Hours

This unit provides insight into the occupational safety and health at workplace.

- Types of ergonomic risk factors
- Effects of ergonomic hazards
- Occupational safety and health at workplace - Applications of ergonomics in different work environments

PRACTICAL (Credits 2; Hours 60)

- 1. Anthropometric Measurements** **8 Hours**
 - Basic Anthropometry of a selected demography
- 2. Work Study** **8 Hours**
 - Time and motion study
 - Energy study - Physiological cost of workload
- 3. Kitchen plans** **20 Hours**
 - Prepare floor and elevation plans for different types of kitchen
- 4. Indices of internal comfort** **6 Hours**
 - Testing suitability of selected environmental factors at a workplace
- 5. Ergonomic Assessment and Occupational safety analysis of Workplaces** **18 Hours**
 - Case study of a selected workplace - Identifying and assessing workplace for a selected occupation, analysis of posture and equipment used, suggestions for improvement in process of the activity
 - Designing workstation/equipment suitable to the selected occupation

Essential Readings

- Bridger, R. (2017). *Introduction to Human Factors and Ergonomics*. CRC Press.
- Salvendy, G. (2012). *Handbook of Human Factors and Ergonomics*. John Wiley & Sons.
- Chakrabarti, D. (1997). *Indian Anthropometric Dimensions for Ergonomic Design*

Practice. National Institute of Design.

- Tosi, F. (2019). *Design for Ergonomics*. Springer Nature.
- Steidl, R.E. & Bratton, E.C. (1968). *Work in the Home*. John Wiley & Sons Inc.

Suggested Readings

- Hedge, A. (2016). *Ergonomic Workplace Design for Health, Wellness, and Productivity*. CRC Press.
- Stanton, N. A., Hedge, A., Brookhuis, K., Salas, E., & Hendrick, H. W. (2004). *Handbook of Human Factors and Ergonomics Methods*. CRC Press.
- Helander, M. (2005). *A Guide to Human Factors and Ergonomics* (2nd ed.). CRC Press.
- Shorrock, S., & Williams, C. (2016). *Human Factors and Ergonomics in Practice: Improving System Performance and Human Well-Being in the Real World*. CRC Press.
- DeChiara, J., Panero, J., & Zelnik, M. (2017). *Time-saver standards for interior design and space planning* (2nd ed.). McGraw-Hill Education.
- Neufert, E., & Neufert, P. (2019). *Architects' data* (5th ed.). John Wiley & Sons.

Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.