

DISCIPLINE SPECIFIC ELECTIVE**DSE HH 7E1: HUMAN FACTORS AND ERGONOMICS****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		
Human Factors and Ergonomics DSE HH 7E1	4	2	0	2	Studied Semester 6	Studied Space Design & Sustainability DSC HH 617

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

- 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 HH 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 and Equipment Design**12 Hours**

This unit focuses on the functional design of workplaces, work study techniques, indices of indoor comfort and man- machine interface.

- 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.

- Identifying 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.