



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Biomedical Engineering

Subject Code : ME02031061

Subject Name : Ergonomics

w. e. f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Professional Elective Course

<b>Prerequisite:</b>	Human Anatomy and Physiology, Biomechanics
<b>Rationale:</b>	Ergonomics deals with the interaction between the user and his or her physical environment. It provides a broad based introduction to ergonomic principles and their application in the design of equipment and the workplace. When the ergonomic design is done in a sociotechnical systems context, outcomes tend to boost all three dimensions of sustainability namely economic, environmental, and social.

### Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Apply basic knowledge of physical ergonomics such as physical load, anthropometry, biological variation and biomechanics.	R, U, A
02	Illustrate proper application of anthropometric measurements for analysis and design	R, U, A, N
03	Analyze the psychosocial aspects of work such as perception, memory, information processing, attention, learning, decision-making, stress and mental workload	U, A, N, E
04	Apply design methodology of ergonomics and obtain the results of product system and draw conclusion	U, A, N, E
05	Design and redesign tasks and workstations using ergonomic knowledge	U, A, N, E, C

\*Revised Bloom's Taxonomy (RBT)

### Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE (E)		PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150



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## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction of ergonomics, Ergonomics/ human Factors fundamentals, work physiology, stress, Human body- structure and function, Basic anatomy & muscle physiology, biomechanics	9	20
2.	Anthropometrics, Anthropometry: body growth and somatypes, Static and dynamic anthropometry, Stand Posture, Anthropometry landmark: Sitting postures, Anthropometric measuring techniques	10	25
3.	Communication and cognitive issues, Psycho-social behavior aspects, behavior and stereotype, Information processing and perception, Cognitive aspects and mental workload	9	25
4.	Ergonomics design methodology, Ergonomics criteria/check while designing, Design process involving ergonomics check, Application of anthropometry in design, Effectiveness and cost-effectiveness	8	15
5.	Determination of work content, Workstation design, Work design, times required for various occupational jobs/tasks, Fundamentals of physical working environment, Worksurface design, Visual display units, Guide lines for the design of static work, Effectiveness and cost-effectiveness	9	15
<b>Total</b>		<b>45</b>	<b>100</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	20	15	15	20

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources:

### (a) Books:

1. Ergonomics for Beginners- A Quick Reference for Beginners, 3rd Edition. Jan Dul and Bernard Weerdmeester. 2008
2. Bridger, RS: Introduction to Ergonomics, 2nd Edition, Taylor & Francis, 2003.
3. Handbook of Human Factors and Ergonomics Methods. Neville Stanton, Alan Hedge, Karel Brookhuis, Eduardo Salas, Hal Hendrick. 2005
4. Green, W.S. and Jordan, P.W, Human Factors in Product Design, Taylor & Francis, 1999
5. Kroemer, K.H.E., Fitting the Human: Introduction to Ergonomics, CRC Press
6. Chakrabarti, Indian Anthropometric Dimensions for ergonomic design practice, National Institute of Design, Ahmedabad, 1997



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**Suggested Course Practical List: If any**

**List of Laboratory/Learning Resources Required: NA**

**Suggested Project List:** Propose an ergonomic solution in terms of product design/process design for a problem identified by you that incorporates the learnings of the subject.

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