

# B.E Semester: 8 Automobile Engineering

**Subject Name: Industrial Engineering and Ergonomics (MA804-N-B)**

**[Dept. Elect.- 6]**

## A. Course Objective:

- To present a problem oriented in depth knowledge of Industrial Engineering and Ergonomics.
- To address the underlying concepts and methods behind Industrial Engineering and Ergonomics.

## B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
3	0	0	3	3	3	70	30	20	0	120

## C. Detailed Syllabus:

Unit No.	Details
1	<b>Industrial Engineering</b> Introduction, history, activities & techniques of Industrial Engineering, Organization of Industrial Engineering Department.
2	<b>Productivity</b> Production & productivity, factors influencing productivity – technological advancement & human factors, measurement of productivity (Productivity Index) , causes of low productivity and techniques of their elimination, improving productivity by reducing work content & ineffective time. <b>Work study</b> Work content, excess work content & ineffective time, Method study – objectives, steps, selection of job, process charts, micro-motion & memo-motion studies, principles of motion economy – Therbligs, Workplace layout, Work Measurement – objectives, steps, techniques, performance rating, allowances of standard time, techniques of work measurement , Work Sampling– confidence levels, methods of work sampling, Computation of machines utilization & standard time , Predetermined Motion Time & Systems (PMTS) , Work Factor System, Method Time measurement (MTM) - MTM basic motion elements, Production study, Physiological work measurement. <b>Product cost concepts &amp; break-even analysis</b> Costs of production, classification of costs, analysis of production costs, Break -even analysis – graphical as well as mathematical analysis, costs – volume – Profit (CVP) analysis, managerial uses of Break even chart, Applications of Break-even analysis. Engineering Economy and Engineering Process requirements of an economy study of an engineering project
3	<b>Human Physical Characteristics</b> Ergonomics and Human Factors Engineering Physiology of Work, Cognitive Psychology and Sensory Processes, Biomechanics and Engineering.

4	<b>Engineering Anthropometry</b> Human Machine System, Machine and Tool Design Work Place and Work Station Design, Work Design, Fundamentals of Physical Working Environment, Information Technology.
5	<b>Office Systems and Ergonomics</b> Ergonomics of Technology Management.
6	<b>Consumer Ergonomics</b> Ergonomics Quality and Safety, Quality of Life

<b>Total hours (Theory):48</b>
<b>Total hours (Practical):00</b>
<b>Total hours:48</b>

#### D. Lesson Planning:

Sr. No.	Date/Week	Unit	Weight age	Topic No
1	1 <sup>st</sup> ,2 <sup>nd</sup>	Unit 1	20%	1,
2	3 <sup>rd</sup> ,4 <sup>th</sup> ,5 <sup>th</sup> ,6 <sup>th</sup> ,	Unit 2	30%	2
3	7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> ,10 <sup>th</sup>	Unit 3	20%	3
4	11 <sup>th</sup> , 12 <sup>th</sup> , 13 <sup>th</sup>	Unit 4	15%	4
5	14 <sup>th</sup> ,15 <sup>th</sup> ,16 <sup>th</sup>	Unit 5	15%	5,6

#### E. Instructional Method & Pedagogy

1	At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2	Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal Weight age should be given to all topics while teaching and conduction of all examinations.
3	Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4	One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5	Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6	Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7	The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

#### F. Students Learning Outcomes:

1	The student can identify different areas of Industrial Engineering and Ergonomics.
2	Can find the applications of all the areas in day to day life.

#### G. Text Books & Reference Books:

1	Telsang M., “Industrial Engineering and Production Management”, S. Chand & Co., New Delhi, 2005.
2	International Labour Organization, Geneva, “Introduction to Work Study”, 2004.
3	Sharma S.K. and Sharma Savita, “Work Study and Ergonomics”, S.K. Kataria & Sons, Delhi,

	2007.
4	Mahajan M., "Industrial Engineering and Production Management", Dhanpat Rai & Sons, Delhi, 2005.
5	Sharma S. K., Sharma Savita and Sharma Tushar, "Industrial Engineering and Operations Management", S.K. Kataria & Sons, New Delhi, 2004.
6	Human Factors in Engineering and Design By Sanders & McCormick (McGrawHill Publication)
7	Occupational Ergonomics – Principles and Applications By Tayyari & Smith (Chapman & Hall Publication)
8	The Power of Ergonomics as a Competitive Strategy By Gross & Right (Productivity Press)