



C.U.SHAH UNIVERSITY – Wadhwan City

FACULTY OF: - Technology and Engineering (Diploma Engineering)

DEPARTMENT OF: - Mechanical Engineering

SEMESTER: - IV **CODE:** - 2TE04IEN1

NAME OF SUBJECT: - Industrial Engineering

Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
<u>2TE04IEN1</u>	Industrial Engineering	03	00	02	05	4	30	1.5	70	03	30	20	----	150

Objective: -

Prosperity of nation in general depends on the productivity of industries and quality of production. Technical managers, engineers, plant operators, machine operators, supervisors and workers working in industries have to compulsorily meet set standards of production in terms of quality, quantity and productivity so as to compete domestic and international market. This is possible for them only when they employ and exploit the principles of industrial engineering. Industrial engineering always aims to achieve higher productivity and better standards of quality through its constant endeavor in design, improvements and installation of integrated systems of human resource, machines and methods.

Course outline:-

Sr. No.	Course Contents	Teaching Hours
1	Introduction to Industrial Engineering Industrial engineering-definition, objectives and techniques, Scope, importance and applications of industrial engineering, Methodology and approach of Industrial engineering, Productivity – concept, definition, importance and ways to enhance it, numeric examples, introduction to work study, introduction to statistical quality control(SQC).	04
2	Work Study. Work study-Definition, techniques and role to enhance productivity, Importance of human factors in application of work study techniques, Basic procedure of method study, Methods of recording data for method study using standard symbols, process charts and diagrams, Preparation of operation (outline) process chart for given mechanical assembly, Preparation of flow process chart and flow diagram for given mechanical components, given the process plan, operation process chart and flow diagram, develop questioning techniques in analyzing data for method study. Also develop and improve the method, based on analysis of given data, Principles of motion economy applied in (a) use of human body, (b) design of work place layout (c) design of tools and equipment, Principles of micro motion study, Therbligs and SIMO chart, Man and machine chart, Basic procedure of work measurement, Equipment used in time study, Job elements and their types, Methods of measuring time-cumulative and fly back timing, Concept of rating and rating scale, Allowances-types, normal values and applications, Calculation of basic time, standard time and work content, Concept of work sampling/ activity sampling.	15

3	Quality Assurance. Definition of quality, quality control (QC), quality assurance (QA), statistical quality control (SQC) and reliability, Importance of quality, Difference between reliability and quality control, Factors affecting and improving reliability, QA tools, Concept of total quality cycle, quality of design, quality of performance, quality of conformity and total quality, Difference between inspection and quality control, Fundamentals of statistics-types of variations, frequency, class boundary and midpoint, frequency distribution, frequency histogram, frequency bar chart and polygon chart, Frequency distribution curve, central tendency, spread or dispersion and range, mode, median and mean, standard deviation and variance with numeric examples, Concept of probability and normal distribution, Area under normal distribution and examples on normal distribution, Introduction to binomial and Poisson distribution.	07
4	Statistical Quality Control (SQC). Concept of variability, SQC tools and statistical fundamentals, Concept and differences between variables and attributes, Control charts for variable quality-types, objectives, applications, calculations of control limits and range/mean, methods to plot and interpretations (X bar-R chart) and examples, Control charts for attribute quality-types, objectives, applications, calculations of control limits and range/mean, methods to plot and interpretations (p, np, 100p and c chart) and examples, Process capability – meaning, definition and method to calculate, numeric examples, Acceptance sampling: (1)Quality control of incoming raw material and components(2)Concepts of random sampling(3)Sampling plans: definition, terminology, types (Single, double and multiple), implementing plans based on given input(4) OC curve-concept, need, types and importance, interpretation of given OC curve.	09
5	Recent trends in industrial Engineering. International Organization for standardization and its role, ISO standard series and quality managements system, Total Quality Control (TQC) and Total Quality Management (TQM)-philosophical concepts, Concept of six sigma and its applications, Concept and applications of Kaizen, definition, objectives and applications of ergonomics, Normal and maximum work area, Environmental requirements of work place.	07

List of Experiments:-

- Given real mechanical assembly having 6-8 components, prepare operation process chart.
- Given real mechanical component having minimum 6-8 mechanical operations, prepare FD.
- Prepare man and machine chart for given situation.
- Calculate co-efficient of co-relation for time study person using performance rating technique.
- Calculate standard time for a given job using decimal minute stop watch techniques
- Frequency distribution curve
- Control charts for variables
- Control charts for attributes
- Acceptance sampling

Learning Outcomes:-

- Use work study and method study methods to improve productivity.
- Analyze work content and calculate standard time in a given situation.
- Apply Statistical Quality Control tools in a given situation.
- Apply Ergonomics for human comfort at work place.
- Appreciate the emerging trends in industrial engineering

Books Recommended:-

- Industrial Engineering and Management, C.Natha Muni Reddy, New age international Publishers.
- Industrial Engineering and Management, O.P. khanna, Dhanpat rai publication.
- Handbook of IE: Technology and operations management, Gavriel Salvendy, Institute of Industrial Engineers.