GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN MECHANICAL ENGINEERING
SEMESTER- VI

Subject Name: **Industrial Engineering**
Subject Code: **2361903**

Sr. No.	Subject Content	Hrs.
1	**INTROUCTION TO INDUSTRIAL ENGINEERING.** 1.1 Know the objectives of learning this subject. 1.2 Need, Scope & importance of Industrial Engineering in industries. 1.3 Need of attitude, knowledge & skill required for application of Industrial engineering. 1.4 Productivity – Concept, importance and ways to enhance it. 1.5 Work study-Definition and techniques. 1.6 Importance of human factors in application of work study techniques. 1.7 Role of work study in productivity improvement.	**2**
2	**TECHNIQUE OF WORK STUDY.** 2.1 Objectives of method study. 2.2 Steps in method study. 2.3 Methods of recording data for method study job with the help of standard symbols, charts and forms. 2.4 Use of questioning technique in analyzing data for method study job. 2.5 Develop and improve the method, based on analysis of problem. 2.6 Motion economy and its importance. 2.7 Design of efficient work place layout using motion economy. 2.8 Chart used for analyzing work place layout. 2.9 Role and scope of micro motion study techniques. 2.10 Presentation of work elements into therbligs. 2.11 Preparation and use of SIMO chart. 2.12 Use of film in micro motion study. 2.13 Plant layout : - Definition, types, applications, advantages and limitations. 2.14 Material handling equipments-Classification and uses. 2.15 Effect of method study on plant layout and material handling. 2.16 Work measurement- - Concept - Need for time study equipment and forms. - Situation which requires time study. - Process of time study. - Concept and applications of rating. - Time study allowances. - Determination of standard time for a given job. - Concept of work sampling.	**12**

	- Other work measurement methods. **Note** : Question/s on preparing chart/s from given data (application type) of 5-7 marks out of total 70, question/s on determining standard time from given data (application type) of 5-7 marks out of total 70.	
3	**JOB EVALUATION, ENRICHMENT, WAGES AND INCENTIVES.** 3.1 Concept of job analysis, job specification, job description, job evaluation and job enrichment. 3.2 Different methods of job evaluation. 3.3 Wages : Principle and types. 3.4 Incentives : Definition, purpose, types , applications and role of incentives in wage plans. **Note** : Question/s (application type) of 4-6 marks out of total 70.	**3**
4	**INTRODUCTION TO QUALITY ASSURANCE (Q.A).** 4.1 Definition of quality, quality control(QC),quality assurance(QA), statistical quality control (SQC) and reliability. 4.2 Historical development of QA and its stages. 4.3 QA tools. 4.4 Concept of probability and normal distribution. 4.5 Concept of variability, SQC tools and statistical fundamentals. **Note** : Problem question/s based on normal distribution (application type) of 4-6 marks out of total 70.	**4**
5	**CONTROLS CHARTS FOR VARIABLES AND ATTRIBUTES.** 5.1 Statistical basis for control charts- Variables and attributes. 5.2 Control charts for variables-X bar-R chart bar-σ(sigma) chart. 5.3 Control charts for attributes-Different types of P-charts-chart. 5.4 Concept and applications of process capability. **Note** : Preparing control chart/s from given data (application type) of 5-7 marks out of total 70.	**6**
6	**STATISTICAL TOLERENCING.** 6.1 Definition and principle of statistical tolerencing. 6.2 Situation which leads to statistical tolerencing. 6.3 Calculation of overall tolerance from given data of components.	**2**

7	**ACCEPTANCE SAMPLING.** 7.1 Quality control of in coming raw material and components. 7.2 Concepts of random sampling. 7.3 Sampling plans : definition, types(Single, double and multiple) 7.4 QC curve.	**2**
8	**RELIABILITY.** 8.1 Concept, definition, difference between reliability and quality control. 8.2 Factors affecting and improving reliability.	**2**
9	**ERGONOMICS.** 9.1 Introduction. 9.2 Psycho-physiological data. 9.3 Enthrocometry. 9.4 Normal and Maximum work area. 9.5 Location of control Knobs, visual displays. 9.6 Fatigue in industry, environmental requirements, effect of Illumination, noise, temperature, humidity.	**2**
10	**EMERGING TRENDS IN INDUSTRIAL ENGINEERING.** 10.1 ISO 9000-Concept, series, features, importance and applications. 10.2 Six sigma-Concept, importance, calculation and applications. 10.3 Total Quality Control (TQC)and Total Quality Management (TQM) –Concept, features, importance and applications. 10.4 KAIZEN-History, concept, applications and advantages. 10.5 Reengineering-Concept, need, advantages and limitations.	**7**
	Total	**42**

Notes:

A. FOR STUDENTS.

a. It is advised that student download this copy of syllabus and plan to achieve the objectives of learning this subject.

B. FOR PAPER SETTER/MODERATOR.

a. Refer GTU syllabus and do not take reference of previous TEB question papers.
b. Ask the questions from each topic having marks weightage proportionate to hours allotted to each topic.
c. Optional questions must be asked from the same topic. That is weightage of compulsory attendance part of questions from each topic will be equal to marks proportionate to hours allotted to each topic.
d. Marks ratio of knowledge: comprehension: application types questions must be 30:30:40 respectively.
e. Submit solution / answer keys along with distribution of marks in each question for the paper being submitted.

Reference Books:

1.	Industrial Engineering and Industrial Management	Pulela
2.	Learning Package in Industrial Engineering	TTTI, Bhopal
3.	Handbook of Industrial Engineering	Gavriel & Salvendy
4.	Work Study	I.L.O.
5.	Industrial Engineering	R.C.Patel
6.	Industrial Engineering	Dalale-Mansurali

Additional Reference Books:

1.	Inspection and Quality Control	N.P.C.
2.	An Introduction to Productivity	N.P.C.
3.	Method Study	N.P.C.
4.	Work Measurement	N.P.C.
5.	Plant Layout and Material Handling	N.P.C.
6.	A Laboratory Manual in Industrial Engineering	TTTI, Bhopal
	Work Study	Curry
7.	Work Study and related Management service	Dennis A.White
		move
8.	Principles of Work study	J .Walker Morris
9.	Motion and Time Study	Mandel
10.	Motion and Time Study	R.M.Barnes