

GUJARAT TECHNOLOGICAL UNIVERSITY

INDUSTRIAL ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Industrial Statistics & Quality Management**
(Department Elective - I)

Subject Code: **171504**

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|---------------------|-----------|---------------------------|----------------------|
| Theory | Tutorial | Practical | Total | University Exam (E) | | Mid Sem Exam (Theory) (M) | Practical (Internal) |
| | | | | Theory | Practical | | |
| 4 | 0 | 2 | 6 | 70 | 30 | 30 | 20 |

| Sr. No | Course Content | Total Hrs. |
|--------|---|------------|
| 1. | Introduction: Meaning and scope of Industrial statistics, common patterns of variations, The normal, binomial and poison distributions and its properties, Elements of Probability as applied to statistics, conditional probability, Bayer's theorem. | 6 |
| 2. | Statistics theory : Measures of central tendency – Mean, Median, Mode, Quartile, measures of dispersion - standard deviation, variance, standard deviation of combined group, absolute and relative measures of dispersion, skewness and kurtosis. | 6 |
| 3. | Probability theory: Probability distribution of discrete and continuous random variable functions, parameters, probability density functions, Mean, Median, Moment, Moment generating functions of binomial, poison, geometric and hypergeometric distributions, Mathematical expectations. | 6 |
| 4. | Tests of significance: Elementary theory and practice of sampling, standard error of means and variance, tests of significance X- test, T-test, F-test, Z-test, and their application. Mathematical expectations. | 10 |
| 5. | Regression and correlation: Curve fitting correlation and Regression, elements of statistical inference and estimation theory applied to engineering problems. | 4 |

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| 6. | Quality: Definition : concepts of quality, total quality and quality control, quality characteristics, economics, policy and objectives, specifications T.Q.M. and various quality standards. | 4 |
| 7. | Inspection: Need for inspection, types of inspections, inspection stages-where and how much to inspect, organizing for inspection. | 4 |
| 8. | Quality control : Basic objectives, Product effectiveness & quality of design, manufacture and performance, total systems cost, quality assurance, benefits from quality assurance on reliability and quality control, quality control and production relationship in organization structure, statistical quality . | 6 |
| 9. | Control charts : General theory, charts for variables and attributes i.e. X R chart, P chart, NP chart and C chart used in process, attributes, process capability charts. | 10 |
| 10. | Acceptance sampling: Elementary concept of sampling by attributes, single & double sampling tables, construction and use of O.C. curve, AQL, LTPD, produces risk, consumers risk, AOQL, O C curve specifications, effect of change of sampling, Introduction to sampling by variables, continuous sampling, designing of sampling plan vendor. | 8 |

Industrial visits to be organized to understand the above topics practically, and assessment of the study during visit will carry weightage in Theory and Practical exams.

Reference Books:

1. Statistical Methods by Schaum's series
2. Quality Assurance engineering by Schmidt.
3. Quality control handbook by Huran (McGraw hill)
4. Total quality control by Teisenbaum (McGraw hill)
5. Introduction to Probability and statistical applications by P.A.,. Mcyer.
6. Probability & statistics for engineer by Freund & Miller
7. Quality control & Industrial Statistics by Duencan (Taraporewala)
8. Statistical quality control by Grant (McGraw hill)