

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE ENGINEERING (25) STATISTICAL TECHNIQUES AND DESIGN OF EXPERIMENT SUBJECT CODE: 2712507 SEMESTER: I

Type of course: Mathematics/Statistics

Prerequisite: Basic mathematics and statistics at BE level

Rationale: At the PG level students are required to develop analytical abilities. They also have to undergo research thesis. Knowledge of statistical tools for validating the results is very essential for textile experiments. Also designing an experiment will lead to valid conclusions which may be replicated elsewhere

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits C | Examination Marks | | | | | | Total Marks |
|-----------------|-----|----|--------------|-------------------|--------|-----------------|--------|----|----|----------------|
| L | T | P | | Theory Marks | | Practical Marks | | | | |
| | | | ESE (E) | PA (M) | PA (V) | | PA (I) | | | |
| ESE | OEP | PA | | | RP | | | | | |
| 3 | 2# | 0 | 4 | 70 | 30 | 30 | 0 | 10 | 10 | 150 |

Content:

| Sr. No. | Topics | Teaching Hrs. | Module Weightage |
|---------|---|---------------|------------------|
| 1 | Various statistical tools and their usefulness. | 4 | 10 |
| 2 | Measurement of dispersion, binomial, Poisson and normal distribution, analysis of discrete and ranking data, acceptance sampling, control charts, correlation and regression, analysis of variance | 8 | 20 |
| 3 | Principles of experimental design, typical application of experimental design, simple comparative experiments, experiment with single factor | 8 | 25 |
| 4 | Various type of design, introduction to factorial designs, 2^k factorial design, two level design, three level design | 8 | 25 |
| 5 | Fitting regression models, multiple regression and correlation analysis, response surface methodology, test of significance and model, lack of fit, use of replicates, use of computers and software package. | 10 | 20 |

Reference Books:

1. Cochran W G and Cox G M, "Experimental Designs", Second Edition, John Wiley and Sons, Inc., New York, 1957.
2. Montgomery D C, "Design and Analysis of Experiments", Fifth Edition, John Wiley and Sons, Inc., New York, 1957.
3. Leaf G A V, "Practical Statistics for the Textile Industry", (Part-I and II), The Textile Institute, UK, 1984.
4. "Statistics for Textile Engineers", Woodhead Publication India

Course Outcome:

After learning the course the students should be able to:

1. Acquire more knowledge in basic concepts of application of statistics in textile
2. Improve problem evaluation technique.
3. Select an appropriate method to solve a practical problem.
4. Develop suitable design for experimental work.
5. Apply statistical tools for validating the results of experiment

List of Open Source Software/learning website:

<http://nptel.iitm.ac.in>, World Wide Web, Google Search Engine etc.