



# GUJARAT TECHNOLOGICAL UNIVERSITY

## Bachelor of Engineering

Subject Code: 3162912

Subject Name : Advanced Textile Processing

**Type of course** : Professional Elective Course

**Prerequisite** : Basic knowledge of Various Textile Chemical Processes

**Rationale** : Advanced chemical processing covers most of the industrial practices and their advancement in to the subject along with advancement in specialty kind of processes.

### Teaching and Examination Scheme:

| Teaching Scheme |   |   | Credits<br>C | Examination Marks |        |                 |        | Total<br>Marks |
|-----------------|---|---|--------------|-------------------|--------|-----------------|--------|----------------|
| L               | T | P |              | Theory Marks      |        | Practical Marks |        |                |
|                 |   |   |              | ESE (E)           | PA (M) | ESE (V)         | PA (I) |                |
| 3               | 0 | 2 | 4            | 70                | 30     | 30              | 20     | 150            |

### Content:

| Sr. No. | Content   | Total<br>Hrs |
|---------|---|--------------|
| 1       | <b>CHEMICAL PROCESSING OF SYNTHETIC AND BLENDED TEXTILES</b><br>Various preparatory processes for manmade textile, dyeing of pet, nylon and acrylic, dyeing of blends practical problems and their solutions. Dyeing of polyester with cationic dyes. Printing of synthetic and blended fabrics with different dye classes. Different functional and easy care finishes on synthetics and blends like anti-static, soil-release, flame-retardant.           | 10           |
| 2       | <b>ENZYME TECHNOLOGY FOR TEXTILE PROCESSING</b><br>Nomenclature and classification of enzymes; characteristic features of enzymes; basics of kinetics of multi-substrate enzyme-catalyzed reactions. Enzymes for cotton fibre chemistry and structure of cotton fibre; enzymes for other fibers enzymes for processing and functionalizing protein fibres;  | 6            |
| 3       | <b>ADVANCES IN PROCESSING MACHINERY</b><br>Advances in fiber dyeing machine - Advances in Beam dyeing - Advances in soft flow dyeing machines, Advances in jet dyeing machines — Developments in jiggers, Continuous dyeing machineries & its developments—Principle and working of fully automatic flatbed screen printing machine –Garment Printing machines- Garment dyeing machines, Tumble dryer, Fusing machines, Backfilling machine                 | 8            |
| 4       | <b>ADVANCES IN TEXTILE PRINTING</b><br>Ink jet printing-evolution of digital printing, Comparison with conventional printing techniques, theoretical foundations for inkjet technologies- Continuous and drop on demand technologies, Pretreatment of substrates for inkjet printing; Ink jet heads;Inks used for printing- Developments in Photo printing, Blast printing with Indigo, Developments in Xerox printing and Laser printing for fancy effects | 8            |



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|   |  |   |
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| 5 | <b>ADVANCED FINISHING TECHNOLOGY</b><br>Commercial importance of finishing –Resin finishing, Mechanism of creasing, Types of Resins. Anti-crease, wash and wear, durable press resin finishing. Concept of Flame proof & flame retardancy. Concept of pyrolysis, Soil Release Finishing: Mechanism of soil retention & soil release. Various soil releases finishes for cotton, Polyester and its blends. Study about mechanical finishing of textile materials like calendaring, compacting, Sanforising, Bleach finishing. Object of Heat setting. | 8 |
| 6 | <b>EFFLUENT TREATMENT</b><br>Introduction. Flow chart of effluent treatment processes. Primary, Secondary and Tertiary treatments. Evaporation and Reverse osmosis. Colour removal in waste water. Recovery and reuse of water. Advances in Effluent Treatment. Introduction to concept of eco-friendly textile, Norms for effluent discharge.   | 4 |

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

#### Reference Books:

1. Chemical technology in the pre- treatment processes of textiles, S.R.Karmakar
2. Technology of bleaching and mercerizing, Vol. III, V. A. Shenai
3. Textile scouring and bleaching, E. R. Trotman
4. Technology of Dyeing, Vol. IV, V. A. Shenai
5. Dyes & Pigment : new research, Arnold R lang
6. Technology of Printing, Vol. IV, Dr. V. A. Shenai.
7. Technology of Finishing, Dr. V. A. Shenai.
8. Textile Finishing, Dr. Nalankilli

#### Course Outcomes:

| Sr. No. | CO statement  | Marks % weightage |
|---------|---|-------------------|
| CO-1    | Understand the need, significance and detailed process of Advances in wet preparatory processes like desizing, scouring, bleaching, optical brightening, etc      | 20                |
| CO-2    | Analyze and Compare different methods for the said preparatory processes from techno-commercial point of view.  | 20                |
| CO-3    | Know about various Advancement in machineries used for various wet processes.   | 20                |
| CO-4    | Know the technical need of the textile printing; Different ingredients required to get print; various styles and methods of printing in the current situation.    | 20                |
| CO-5    | Know the principle, techno-physical aspects, machineries and application process of different mechanical finishes on natural, regenerated and synthetic textiles. | 20                |



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#### List of Experiments:

1. To carry out enzymatic Desizing of cotton blended fabric.
2. To carry out bleaching of scoured cotton blended fabric.
3. To carry out dyeing of Nylon fabric using acid dye.
4. To carry out dyeing of polyester fabric using cat ionic dyes.
5. To carry out dyeing of acrylic yarn using basic dye.
6. To produce soil release finish on given fabric sample.
7. To carry out printing of polyester fabric by inkjet printing.
8. To carry out photo printing on polyester fabric.
9. To impart temporary and permanent stiff finish to the nylon fabric using suitable stiffening agents.
10. To impart printing effect using suitable technique on readymade garment.
11. To impart stone finish on denim.

#### Major Equipment:

Water Heating Bath, Kier, Padding Mangle, HTHP Beaker Dyeing Machine, Oven, HTHP Steamer, Etc.

#### List of Open Source Software/learning website:

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