

Syllabus of  
UNDERGRADUATE DEGREE COURSE

Textile Engineering



Rajasthan Technical University, Kota  
Effective from session: 2021 – 2022



# RAJASTHAN TECHNICAL UNIVERSITY, KOTA

## SYLLABUS

2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common with 3TC2-01, 3TT2-01]

### 3TE2-01: ADVANCED ENGINEERING MATHEMATICS- I

**Credit: 3**  
**3L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 3 Hours**

SN	Contents	Hours
1	<b>Laplace Transform:</b> Laplace transform, Inverse transform, properties, Transforms of derivatives and integrals, Unit step function, Dirac's delta function, Differentiation and integration of transforms.	5
2	<b>Applications of Laplace transform:</b> Applications of Laplace Transform to the solution of ordinary and partial differential equations having constant coefficients with special reference to the wave and diffusion equations.	6
3	<b>Numerical Analysis -I:</b> Finite differences, Difference operators: forward, Backward, central and average operators. Newton's forward and backward interpolation formula, Stirling's central difference formula Lagrange's interpolation formula for unequal interval	5
4	<b>Numerical Analysis -II:</b> Numerical differentiation, Numerical integration trapezoidal rule, Simpson's one third and three eight rule. Numerical solution of ordinary differential equation of first order: Picard's method, Euler's, and modified Euler's, method, Milne's methods and Runge-Kutta fourth order method	8
5	<b>Statistics &amp; Probability:</b> Measures of central tendency, measure of dispersion, Basic Concepts of probability, Conditional Probability, Bayes' Theorem.	7
6	<b>Random Variable and distributions:</b> Discrete and continuous random variable, Moments, Expectation, Moment generating function, Binomial, Poisson and Normal distribution <b>Hypothesis Testing:</b> t-Test, Z-test, F-test, Chi-square test.	9
<b>Total</b>		<b>40</b>

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2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common with 3TC1-02, 3TT1-02]

### 3TE1-02: TECHNICAL COMMUNICATION

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 2 Hours**

SN	Contents	Hours
1	<b>Introduction to Technical Communication-</b> Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.	4
2	<b>Comprehension of Technical Materials/Texts and Information Design &amp; development-</b> Reading of technical texts, Reading and comprehending instructions and technical manuals, Interpreting and summarizing technical texts, Note-making. Introduction of different kinds of technical documents, Information collection, factors affecting information and document design, Strategies for organization, Information design and writing for print and online media.	6
3	<b>Technical Writing, Grammar and Editing-</b> Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.	8
4	<b>Advanced Technical Writing-</b> Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals, Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.	8
	<b>Total</b>	<b>26</b>

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2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common with 3TC1-03, 3TT1-03]

### 3TE1-03: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 2 Hours**

SN	Contents	Hours
1	<b>Basic economic concepts-</b> Meaning, nature and scope of economics, deductive vs inductive methods, static and dynamics, Economic problems: scarcity and choice, circular flow of economic activity, national income-concepts and measurement.	4
2	<b>Demand and Supply analysis-</b> Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting –purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply.	5
3	<b>Production and Cost analysis-</b> Theory of production- production function, law of variable proportions, laws of returns to scale, production optimization, least cost combination of inputs, isoquants. Cost concepts-explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation.	5
4	<b>Market structure and pricing theory-</b> Perfect competition, Monopoly, Monopolistic competition, Oligopoly.	4
5	<b>Financial statement analysis-</b> Balance sheet and related concepts, profit and loss statement and related concepts, financial ratio analysis, cash-flow analysis, funds-flow analysis, comparative financial statement, analysis and interpretation of financial statements, capital budgeting techniques.	8
<b>Total</b>		<b>26</b>

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2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common with 3TC3-04, 3TT3-04]

### 3TE3-04: OBJECT ORIENTED PROGRAMMING

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 2 Hours**

SN	Contents	Hours
1	Introduction: Review of structures in C, accessing members of structures using structure variables, pointer to structures, passing structures to functions, structures as user defined data types.	5
2	Introduction to programming paradigms- Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public Basics of C++: Structure of C++ programs, introduction to defining member functions within and outside a class, keyword using, declaring class, creating objects, constructors & destructor functions, Initializing member values with and without use of constructors, simple programs to access & manipulate data members, cin and cout functions. Dangers of returning reference to a private data member, constant objects and members function, composition of classes, friend functions and classes, members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security.	10
3	Operator overloading: Fundamentals, Restrictions, operator functions as class members v/s as friend functions. Overloading stream function, binary operators and unary operators. Converting between types.	5
4	Inheritance: Base classes and derived classes, protected members, relationship between base class and derived classes, constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding.	5
5	Multiple inheritance, virtual base classes, and class members, multiple class members. Templates, exception handling.	5
<b>Office of Dean Academic Affairs</b>		<b>Total 30</b>
<b>Rajasthan Technical University, Kota</b>		



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## SYLLABUS

2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common with 3TC4-05, 3TT4-05]

### 3TE4-05: TEXTILE FIBERS

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 2 Hours**

SN	Contents	Hours
1	General definitions and important terminologies related to textiles; Classification of textile fibres; Essential and desirable properties of textile fibres and their role in final products; Advantages and disadvantages of natural and manmade fibres. Polymerization, degree of polymerization, inter polymer forces of attraction, requirements of fibre forming polymers and general considerations with regard to fibre properties	8
2	Cotton: Geographical distribution, cultivation practices, morphological structure, physical and chemical properties; Different varieties of cotton and their uses. Bast and leaf fibres such as jute, linen, hemp, ramie, sisal etc: extraction techniques and processes, structure and chemical composition, properties and their uses.	7
3	Classification and varieties of wool and other animal hair fibres, sorting and grading of wool, fibre extraction, chemical composition, morphological structure, chemical and physical properties of wool, applications.	5
4	Varieties of natural silk, rearing of silk worm, chemical compositions, morphological structure, properties and uses of various types of silk; silk reeling, throwing and weighting, varieties of silk yarns and fabrics.	5
5	Introduction to the manufacturing processes of important man-made fibres, viz. viscose rayon and acetate rayon, polyester, N <sub>6</sub> and N <sub>66</sub> , acrylic, polypropylene, their important physical and chemical properties and applications.	5
<b>Total</b>		<b>30</b>

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### 3TE4-06: MECHANISMS OF YARN MANUFACTURING – I

**Credit: 3**  
**3L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 3 Hours**

SN	Contents	Hours
1	<ul style="list-style-type: none"><li>• System of expressing yarn linear density.</li><li>• Object of ginning</li><li>• Description and working of knife-roller, Mecarthy and Saw gin</li><li>• Objects of mixing.</li><li>• Principles underlying the selection of cotton for mixing.</li></ul> Different methods of mixing	8
2	<ul style="list-style-type: none"><li>• Study of different blending methods, their advantages and disadvantages.</li><li>• Problems in blending of man-made fibre with cotton</li><li>• Objects of blow-room</li><li>• Various types of openers, their construction and working</li></ul>	8
3	<ul style="list-style-type: none"><li>• Lap forming mechanisms</li><li>• Objects and arrangements of calendar roller and their weighing</li><li>• Selection of machinery according to the type of cotton and their suitable combinations</li></ul>	8
4	<ul style="list-style-type: none"><li>• Nature of waste extracted in various openers and beaters</li><li>• Lap rejection causes of lap defects and their remedies.</li><li>• Processing parameters for working different varieties of cotton in blow room.</li><li>• Calculations pertaining to production of blow-room machinery under normal mill conditions.</li></ul>	8
5	<ul style="list-style-type: none"><li>• Blow room accessories e. g; Shirley analyzer, Lap meter, Varimeter, V-signal, moisture indicator.</li><li>• Introductory idea about cleaning efficiency and opening efficiency of blow room machinery</li><li>• Brief outline of setting the blow room line for man-made fibers</li><li>• Measurement of blow room performance . Lap quality parameteras.</li><li>• Measurement of performance of blow room: opening efficiency, cleaning efficiency, lap regularity and waste percentage</li></ul>	8
<b>Office of Dean Academic Affairs</b>		<b>Total 40</b>

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2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

### 3TE4-07: MECHANISMS OF FABRIC MANUFACTURING – I

**Credit: 3**  
**3L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 3 Hours**

SN	Contents	Hours
1	Various systems of yarn production, Sequence of machines in the weaving preparation department for different classes of fabrics. Warp winding – objects of winding, Tensioners and tension setting, Yarn clearers and its settings. Yarn classifying systems. Traverse mechanism for cross wound pickings.	8
2	Classification of winding machines, Concept of precision winding., Rotoconer winding machine. Automatic winding machine, Autoconer – passage and technical details. Production calculation of various winding machines. Pirn winder, object, shape of pirns. Types of Hacoba pirn winder.	8
3	Introduction to weaving. Process and type of Looms, Plain, Hand Loom, Power Loom, Loom: Primary, secondary and auxiliary motions, Loom drive , Production and efficiency calculations, Various ways of shedding & types of sheds, Tappet shedding mechanism, different types & idea of construction of tappet, Determination of Tappet lift.	8
4	Early & late shedding calculation of lift of tappet. Various type of picking mechanism-Under & over pick mechanism, Early & late picking concept, Reason of shuttle fly & shuttle trap, Shuttle speed calculations.	8
5	Sley beating up motion types of temple & utility on loom. Negative and continuous take –up motion (advantages and disadvantages), Five & seven wheel take up motion and their calculation.	8
<b>Total</b>		<b>40</b>

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2<sup>nd</sup> Year - III Semester: B.Tech. : Textile Engineering

[Common  
with 3TT4-08]

### 3TE4-08: TEXTILE CHEMICAL PROCESSING-I

**Credit: 2**  
**2L+0T+0P**

**Max. Marks: 100 (IA:30, ETE:70)**  
**End Term Exam: 2 Hours**

SN	Contents	Hours
1	<b>Introduction of Wet Processing</b> Impurities in raw cotton, wool, silk and linen fibre.	4
2	Adventitious impurities in Grey fabrics made out of cotton, wool and silk. Elementary knowledge of processing. Objects of different processes involved in singeing, desizing, scouring, bleaching.	4
3	<b>Pretreatments:</b> Processing sequence in conversion of Grey cotton goods into semi bleached, full bleached and and Mercerization.	4
4	Pretreatments of wool and silk fabric. Introductory knowledge of machinery used in scouring and bleaching of cotton fabric	4
5	<b>Dyeing:</b> General methods of dyeing by important classes of dyes on natural and man-made fibers e.g. direct, acid, basic, vat, azoic, sulphur and disperse dyes Introductory knowledge of dyeing machines	9
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### PRACTICALS

#### **3TE4-21: Textile Fiber Identification & Analysis Practical**

**Credit: 1**

**Max. Marks: 100 (IA:60, ETE:40)**

**OL+OT+2P**

Principle of microscopy, microscopic identification of fibers, preparation and mounting of specimen for longitudinal view. Microscopy. Standard scheme of analysis of homogenous fiber and blends by physical and chemical methods. Qualitative and Preparation of reagents used for chemical analysis.



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### 3TE4-22: Spinning Practical –I

**Credit: 2**

**Max. Marks: 100 (IA:60, ETE:40)**

**OL+OT+4P**

Practice in handing and operation of blow room. Study of constructional details of machinery: Various controls, change place, etc. Practice in checking of the quality of lap Calculation pertaining to blow-room.

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### 3TE4-23: Weaving Practical –I

**Credit: 2**

**Max. Marks: 100 (IA:60, ETE:40)**

**OL+OT+4P**

Pirn winding machine special mechanism of Hacoba Pirn winding machine and various devices Supply packages like Cone, Chese, cone winding machine. Primary motions, i.e. shedding, picking beating. Secondary motion i.e. take-up, let –off (positive & negative). Drawing in process type of heald frame and Reed. Calculation of speed and production weaving machines.



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### 3TE4-24: Textile Chemical Processing Lab-I

**Credit: 1**

**Max. Marks: 100 (IA:60, ETE:40)**

**OL+OT+2P**

Pre-treatments such as desizing, scouring, bleaching and mercerization of natural and synthetic fibers. Dyeing of cotton, and viscose with direct, reactive, vat and sulphur dye. Dyeing of wool, silk with acid reactive, metal complex and chrome dyes. Dyeing of polyester and Nylon fibre.



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### 3TE7-30: INDUSTRIAL TRAINING

**Credit: 1**

**Max. Marks: 100 (IA:60, ETE:40)**

**OL+OT+1P**

Each student, individual or in association with some other students at the end of the First B.TECH. course will observe and collect the general and technical information pertaining to machinery, raw materials used, yarns and fabrics produced by the textile mills, in which he/she/they are undertaking 2 weeks' in-house training with the approval of the **Principal, M.L.V.T.E.C.** Each student will have to submit a written/typed report duly approved and signed by the guide to the Head of the department.

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