

**DKTE Society's**  
**TEXTILE & ENGINEERING INSTITUTE**

**Rajwada, Ichalkaranji 416115**  
**(An Autonomous Institute)**

**DEPARTMENT: TEXTILES**

**CURRICULUM**  
**B. Tech. Textile Technology Program**

**First Year**

With Effect From  
2023-2024



Promoting Excellence in Teaching  
Learning & Research

# D.K.T.E Society's Textile and Engineering Institute, Ichalkaranji

(An Autonomous Institute)

**Teaching and Evaluation Scheme for Year 2023-24**

**Programme: Textile Technology**

**First Year B. Tech. (Semester – I) NCrf Level : 4.5**

**w.e.f. 2023-24**

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
				L	T	P	Contact Hrs./wk		Theory		Practical		TOTAL	
									CIE		SEE	CIE		SEE
									SE-I	SE-II				
1	01TTL151	Mathematics and Statistics I	BSC	3			3	3	25	25	50			100
2	01TTL152	Applied Physics	BSC	3			3	3	25	25	50			100
3	01TTL153	Design Thinking and Drafting	ESC	2			2	2	25	25	50			100
4	01TTL154	Textile Fibres	BSC	3			3	3	25	25	50			100
5	01TTL101	Yarn Forming Technology I	PCC	3			3	3	25	25	50			100
6	01TTP155	Design Thinking and Drafting Lab	AEC01			2	2	1				50		50
7	01TTP156	Yarn Forming Technology I Lab	VSEC			2	2	1				50		50
8	01TTP157	Idea Lab	VSEC			2	2	1				50		50
9	01TTP158	Basic Computer Programming Lab	AEC01			2	2	1				50		50
<b>Total</b>				<b>14</b>	<b>0</b>	<b>8</b>	<b>22</b>	<b>18</b>	<b>125</b>	<b>125</b>	<b>250</b>	<b>200</b>	<b>0</b>	<b>700</b>

L- Lecture

T-Tutorial

P-Practical

SE-I : Semester Examination-I

SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation

SEE- Semester End Examination

Course Category	BSC/ESC		Program Courses		Multidisciplinary Courses		Skill Courses	Humanities Social Science and Management (HSSM)				Experiential Learning Courses				Liberal Learning Courses
	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp / Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int/OJT	CC
<b>Credits</b>	9	2	3	0	0	0	2	2	0	0	0	0	0	0	0	0
<b>Cumulative Sum</b>	9	2	3	0	0	0	2	2	0	0	0	0	0	0	0	0

**Progressive Total Credits: 18**

# D.K.T.E Society's Textile and Engineering Institute, Ichalkaranji

(An Autonomous Institute)

**Teaching and Evaluation Scheme for Year 2023-24**

**Programme: Textile Technology**

**First Year B. Tech. (Semester – II) NCrF Level : 4.5**

**w.e.f. 2023-24**

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
									Theory		Practical		TOTAL	
									CIE		SEE	CIE		SEE
									SE-I	SE-II				
1	01TTL161	Mathematics and Statistics II	BSC	3			3	3	25	25	50			100
2	01TTL163	Applied Mechanics	ESC	3			3	3	25	25	50			100
3	01TTL164	Electrical Technology	ESC	3			3	3	25	25	50			100
4	01TTL165	Industrial Chemistry	BSC	3			3	3	25	25	50			100
5	01TTL102	Fabric Forming Technology I	PCC	3			3	3	25	25	50			100
6	01TTP162	Indian Traditional Textiles	IKS		2		2	2				50		50
7	01TTP166	Electrical Technology Lab	AEC01			2	2	1				50		50
8	01TTP167	Industrial Chemistry Lab	AEC01			2	2	1				50		50
9	01TTP168	Fabric Forming Technology I Lab	VSEC			2	2	1				50		50
10	01TTP169	Professional Communication	AEC02		2		2	2				50		50
11	01TTI170	Democracy, Election and Good Governance	IKS									50		50
<b>Total</b>				<b>15</b>	<b>4</b>	<b>6</b>	<b>25</b>	<b>22</b>	<b>125</b>	<b>125</b>	<b>250</b>	<b>300</b>		<b>800</b>

L- Lecture

T-Tutorial

P-Practical

SE-I : Semester Examination-I

SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation

SEE- Semester End Examination

	BSC/ESC		Program Courses		Multidisciplinary Courses		Skill Courses	Humanities Social Science and Management (HSSM)				Experiential Learning Courses				Liberal Learning Courses
Course Category	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp / Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int/OJT	CC
<b>Credits</b>	6	6	3	0	0	0	1	4	0	2	0	0	0	0	0	0
<b>Cumulative Sum</b>	15	8	6	0	0	0	3	6	0	2	0	0	0	0	0	0

**Progressive Total Credits: 40**

**Exit Option: An Additional 4 credits - Internship and Major Course.**

**First Year B. Tech - Textile Technology  
Semester-I**

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits
				L	T	P	Contact Hrs./wk	
1	01TTL151	Mathematics and Statistics – I	BSC	3			3	3
2	01TTL152	Applied Physics	BSC	3			3	3
3	01TTL153	Design Thinking and Drafting	ESC	2			2	2
4	01TTL154	Textile Fibres	BSC	3			3	3
5	01TTL101	Yarn Forming Technology – I	PCC	3			3	3
6	01TTP155	Design Thinking and Drafting (Lab)	AEC01			2	2	1
7	01TTP156	Yarn Forming Technology - I (Lab)	VSEC			2	2	1
8	01TTP157	Idea Lab	VSEC			2	2	1
9	01TTP158	Basic Computer Programming Lab	AEC01			2	2	1
		<b>Total</b>		<b>14</b>	<b>0</b>	<b>8</b>	<b>22</b>	<b>18</b>

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester –I)**  
**01TTL151: Mathematics and Statistics- I**

Teaching Scheme: Lectures: 3 Hrs/Week	Credits  3	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. Introduce students with Normal form, Echelon form and Rank of matrix & use them to solve the system of equations. Also introduce students with the theory of finding derivative numerically & use it to solve problems of numerical differentiation.
2. Introduce students with the theory of finding partial derivatives & apply it for finding errors, approximations maxima and minima.
3. Introduce students with basic concept of statistical data, collection and types of data, classification, graphical representation, frequency distribution with construction, measures of central tendency and dispersion. Prepare them to solve problem of these concepts with interpretation.
4. Introduce students with concept of skewness and kurtosis, measures of skewness and kurtosis. Prepare them to solve and interpret problems of skewness.

**Course Outcomes:**

At the end of the course, students will be able to

1. The theory of normal form, echelon form and rank of matrix & apply it to solve system of equations, the theory of finding derivative numerically and also able to solve problems of numerical differentiation.
2. The theory of finding derivative partially and able to solve the problems of application of partial differentiation.
3. Concept of statistical data collection, types of data, classification, graphical representation, frequency distribution and its construction, central tendency and dispersion of data, measures of central tendency and dispersion. Also, they are able to analyze and interpret given statistical data using these concepts.
4. Concept of skewness and kurtosis, measures of skewness and kurtosis. Also, they are able to solve and interpret problems of skewness.

**Course Contents**

<b>Unit I</b>	<b>Matrix</b>	<b>05 Hours</b>
Rank of matrix (Normal form of matrix, Echelon form of Matrix), Solution of simultaneous linear equations (Homogeneous & Non- Homogeneous)		
<b>Unit II</b>	<b>Numerical Differentiation</b>	<b>05 Hours</b>
Newton's forward & backward difference formulae, Sterling's central difference formula. Newton's divided difference formula.		

<b>Unit III</b>	<b>Partial Differentiation</b>	<b>10 Hours</b>
Introduction of Partial Differentiation, Differentiation of implicit functions, Euler's theorem on homogeneous function. Jacobean ( $J.J'=1$ ) only, Application of PD for Errors- approximations and maxima-minima.		
<b>Unit IV</b>	<b>Introduction of Statistics</b>	<b>08 Hours</b>
Definitions of Population, Variable, Attribute, Census Survey, Sample Survey, Random sample. Raw statistical data, collection, classification, Frequency distribution, class limits & boundary, class width, mid-point. Histogram, Frequency polygon, Frequency curve. Measures of central tendency: Arithmetic Mean (A.M.), Median, Mode, Combined Mean & Partition values: Quartiles Deciles and Percentiles with computation.		
<b>Unit V</b>	<b>Measures of dispersion</b>	<b>07 Hours</b>
Range, Quartile deviation, Mean deviation, Standard deviation as Absolute measures of dispersion, Coefficient of range, quartile deviation, mean deviation, coefficient of variation as Relative measures of dispersion, consistency of data & computation.		
<b>Unit VI</b>	<b>Measures of Skewness&amp; kurtosis</b>	<b>05 Hours</b>
Skewness, types, Karl Pearson's & Bowley's coefficient of skewness & Computation. Kurtosis definition and types only. (No Examples of Kurtosis)		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. A textbook of applied mathematics Vol.-I &amp; II by P.N. &amp; J.N. Wartikar</li> <li>2. Higher engineering mathematics by B.S. Grewal</li> <li>3. A textbook of applied mathematics by Bali, Saxena, Iyengar.</li> <li>4. Mathematical Statistics by J.E. Freund.</li> <li>5. Probability &amp; Statistics for engineers by Johnson.</li> <li>6. Statistical methods by Kumbhojkar.</li> </ol>		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester -I)**  
**01TTL152: Applied Physics**

Teaching Scheme: Lectures: 3 Hrs/Week	Credits 3	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To Understand properties of matter such as surface tension, viscosity, elasticity and their applications.
2. To Understand the concepts of diffraction, polarization and their applications.
3. To Understand working principle of laser and photocell.
4. To Understand basic concepts related to crystallography.

**Course Outcomes:**

At the end of the course, students will be able to

1. Understand properties of matter such as surface tension, viscosity, elasticity etc. and their applications.
2. Comprehend the concepts of diffraction, polarization and their applications.
3. Apply the working principles of photocell, LASER and their applications in engineering.
4. Analyze crystal structure by x-ray diffraction.

**Course Contents**

<b>Unit I</b>	<b>Elasticity</b>	<b>7 Hours</b>
Stress, strain, Hooke's Law of elasticity, breaking stress, Working stress, Factor of safety. Some peculiar traits and Factors affecting elasticity. Poisson's ratio, Young's modulus, bulk Modulus and Modulus of rigidity. Relation between $Y$ , $\eta$ and $K$ , Twisting couple on a cylinder (for wire), Torsional rigidity.		
<b>Unit II</b>	<b>Viscosity</b>	<b>6 Hours</b>
Newton's Law of viscosity, Streamline & Turbulent flow, Critical velocity, Significance of Reynold's number, Stokes law, Terminal velocity and its expression. Poiseuille's equation for flow of a liquid through a horizontal capillary tube. Experimental determination of $\eta$ for a liquid by Poiseuille's method, Working of Ostwald's viscometer. Applications of viscosity.		
<b>Unit III</b>	<b>Friction and Surface Tension</b>	<b>6 Hours</b>
Friction, Types of friction, Laws of friction, Coefficient of friction, Factors affecting frictional intensity, importance of friction in textile. Molecular theory of surface tension. Surface energy, Angle of contact, capillary action, Expression for rise of liquid in capillary-by-capillary rise method. Applications of surface tension. Excess pressure inside a liquid drop and soap bubble.		

<b>Unit IV</b>	<b>Wave Optics</b>	<b>7 Hours</b>
<p>Laws of refraction, refractive index, total internal reflection. Magnifying Power and Resolving power. Construction &amp; working of electron microscope.</p> <p>Polarization of light, Double refraction, Nicol prism, Quarter wave and Half wave plate. Production and analysis of circularly and elliptically polarized light.</p>		
<b>Unit V</b>	<b>Photonics</b>	<b>7 Hours</b>
<p>Stimulated Absorption, Spontaneous emission, Stimulated emission. Characteristics of laser, Gas Laser (CO<sub>2</sub> laser), Applications of Laser in textile industry.</p> <p>Photoelectric effect, Einstein's photoelectric equation. Factors affecting the photoelectric effect. Photoelectric sensors, Use of photoelectric sensors in textile industry.</p>		
<b>Unit VI</b>	<b>Crystallography</b>	<b>6 Hours</b>
<p>Production of x-rays by modern Coolidge tube, Properties and Applications of X-rays, X-ray spectrum.</p> <p>Introduction to crystallography, Miller indices of crystallographic planes, interplanar spacing, x-ray diffraction, Bragg's law, determination of crystal structure by Bragg's x-ray spectrometer.</p>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Elements of Properties of Matter by D.S. Mathur</li> <li>2. Engineering Physics by B.L. Theraja</li> <li>3. Engineering Physics by R.K. Gour &amp; Gupta</li> <li>4. Physics for Engineers by M.R. Srinivasan</li> <li>5. Text Book of Optics by Brijlal &amp; Subramanyam</li> <li>6. Optics by A.K. Ghatak</li> </ol>		



**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. Textile Technology (Semester – I)**  
**01TTL153: Design Thinking and Drafting**

Teaching Scheme: Lectures: 02 Hrs/Week	Credits  02	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To introduce procedure for converting an idea into design.
2. To convert 2-dimensional views in to 3-dimensional view.
3. To convert 3-dimensional view from given 2-dimensional views.
4. To understand procedure for drawing development of solids such as cone, cylinder, prism and pyramid.

**Course Outcomes:**

At the end of the course, students will be able to

1. Generate ideas through design thinking.
2. Draw 2-dimensional views from the given pictorial 3-dimensional view.
3. Draw 3-dimensional view from given 2-dimensional views.
4. Draw Development of lateral surfaces of solids such as cone, cylinder, prism & pyramid.

**Course Contents**

<b>Unit I</b>	<b>Introduction to Design Thinking</b>	<b>02 Hours</b>
Principles of design thinking, stages of design thinking, benefits of design thinking, team-based design thinking, tools of design thinking.		
<b>Unit II</b>	<b>Applications of Design Thinking</b>	<b>02 Hours</b>
Design thinking for Business Process Modeling, Prototyping, Strategic Innovation, Importance of Design Thinking Workshop.		
<b>Unit III</b>	<b>Introduction to Drafting</b>	<b>05 Hours</b>
Lines, Letterings, and dimensioning. Introduction to Projection of Points, Lines, Planes, Solids and Section of Solids inclined to both planes H.P. and V.P.		
<b>Unit IV</b>	<b>Orthographic Projections and Sectional Orthographic views</b>	<b>06 Hours</b>
General principles, First angle method, Third angle method, Cutting plane, Types of sections, drawing orthographic views (Elevation, Plan and End view) and sectional views of machine components.		
<b>Unit V</b>	<b>Isometric Projections</b>	<b>04 Hours</b>
Principle, Isometric scale, Isometric views, Making Isometric drawings of simple objects from orthographic views.		

<b>Unit VI</b>	<b>Development of Surfaces</b>	<b>07 Hours</b>
Introduction to solids (Types of solids only), Development of lateral surfaces of cubes, prisms, pyramids, cylinders & cones.		
<b>Reference Books:</b>		
<ol style="list-style-type: none"><li>1. Product Design and Development- Karl Ulrich, Steven Eppinger, Anita Goyal.</li><li>2. Engineering Design – George Dieter.</li><li>3. Engineering Drawing by N. D. Bhatt &amp; V. M. Panchal.</li><li>4. Engineering Drawing by Venugopal.</li><li>5. Machine Drawing by N. D. Bhatt &amp; V. M. Panchal.</li><li>6. Machine Drawing by K. L. Narayana, Kannaiah P., K. Venkata Reddy.</li></ol>		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester –I)**  
**01TTL154: Textile Fibres**

Teaching Scheme: Lectures: 3 Hrs/Week	Credits  3	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To explain the basics of textile fibres.
2. To describe the morphological and chemical structure of natural fibres.
3. To describe the manufacturing processes of manmade fibres.
4. To explain the properties of natural and manmade fibres.

**Course Outcomes:**

- At the end of the course, students will be able to
1. Explain the basics of textile fibres.
  2. Describe the morphological and chemical structure of natural fibres.
  3. Explain the manufacturing processes of manmade fibres.
  4. Enunciate properties of natural and manmade fibres.

**Course Contents**

<b>Unit I</b>	<b>Introduction</b>	<b>6 Hours</b>
Concepts of Fibre, Yarn and Fabric, Staple fibre, Filament, Regenerated fibre, Synthetic fibre, Degree of polymerization, Crystallinity, Orientation. Classification of fibres. Advantages and disadvantages of natural & manmade fibres. Characteristics of fibre forming polymer. Essential and desirable characteristics of textile fibres, The requirement of fibre formation, Introduction to Textile Value Chain.		
<b>Unit II</b>	<b>Vegetable Fibres</b>	<b>6 Hours</b>
Cotton Fibre: Cultivation and harvesting, Development of fibre in seed, Morphological structure, Properties and applications of Cotton fibre. Bast Fibres: Retting and extraction process of Bast fibres, Properties and applications of Jute fibres. Introduction to other vegetable fibres.		
<b>Unit III</b>	<b>Animal Fibres</b>	<b>6 Hours</b>
Wool: Types and grading of wool, Morphological structure, Properties and applications. Silk: Types of silk, Production of silk, Morphological structure, Properties and applications.		
<b>Unit IV</b>	<b>Manmade Fibre Formation Technologies</b>	<b>4 Hours</b>
Melt Spinning, Dry Spinning, Wet Spinning, Advantages and disadvantages of these man made spinning technologies, Comparison between different man-made fibre formation technologies.		
<b>Unit V</b>	<b>Manmade Fibres</b>	<b>10 Hours</b>
Polyester (Polyethylene Terephthalate): Manufacturing process, Properties and applications, Polyamide Fibres (Nylon 6 & Nylon 66): Manufacturing process, Properties and applications, Polyolefin Fibres (Polypropylene): Manufacturing process, Properties and applications. Polyacrylonitrile Fibre: Manufacturing process, Properties and applications. Polyurethane Fibres: Extensibility and recovery mechanism, Manufacturing process, Properties and applications		

<b>Unit VI</b>	<b>Regenerated Fibres</b>	<b>4 Hours</b>
Viscose Rayon: Manufacturing process, Properties and applications. Introduction to other regenerated fibres.		
<b>Reference Books:</b>		
<ol style="list-style-type: none"><li>1. S.P. Mishra, A Textbook of Fibre Science and Technology, New Age International (P.) Limited, ISBN: 9788122412505 (2000).</li><li>2. J. Gordon Cook, Handbook of Textile Fibres. Volume 1 Natural Fibres, Woodhead Publishing Series in Textiles ISBN:978-1-85573-484-5 (1984).</li><li>3. J. Gordon Cook, Handbook of Textile Fibres. Volume 2 Man-Made Fibres, Woodhead Publishing Series in Textiles, ISBN: 978-1-85573-485-2 (1984).</li><li>4. Murthy, H. V. Sreenivasa, Introduction to Textile Fibres, Woodhead Publishing India in Textiles, ISBN:978-93-85059-57-5 (1984).</li><li>5. R. W. Moncrieff, Man-made Fibres, Heywood Books, Open Library-OL5656433M (1966).</li><li>6. V. R. Gowariker, Polymer Science, New Age International Publishers; Third edition, ISBN: 9387788644, (2019).</li></ol>		

**DKTES Textile and Engineering Institute , Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester – I)**  
**01TTL101: Yarn Forming Technology- I**

Teaching Scheme: Lectures : 03 Hrs/Week	Credits  03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. Introduce the fibre properties, staple yarn spinning processes and basics of yarn numbering system.
2. Introduce the process and methods used for cotton cultivation and harvesting.
3. Introduce working principle, constructional details and factors affecting cotton ginning process.
4. Introduce the fibre opening and cleaning process.

**Course Outcomes:**

At the end of the course students will be able to,

1. Explain the fibre properties, staple yarn spinning processes and basics of yarn numbering system.
2. Explain the process and methods used for cotton cultivation and harvesting.
3. Explain working principle, constructional details and factors affecting cotton ginning process.
4. Explain the fibre opening and cleaning process.

**Course Contents**

<b>Unit I</b>	<b>Introduction to fibre and yarn numbering system</b>	<b>07 Hours</b>
Definition of terms – Textile Fibres, Staple fibre, Filament, Staple yarn, Filament yarn. Classification of fibres and yarns. Essential and desirable properties of fibres and their impact on staple spinning. Different cotton varieties cultivated in India. Process flow chart for Ring, Rotor and Air-jet yarn manufacturing. Objects of machines in spinning process. Yarn numbering systems – Introduction, Importance, Direct and Indirect yarn numbering systems. Related calculations. Resultant yarn count calculations.		
<b>Unit II</b>	<b>Cotton cultivation and Harvesting</b>	<b>07 Hours</b>
Indian Cotton Cultivation. Factors affecting the cotton cultivation. Cotton Harvesting – Factors affecting the cotton harvesting, Types of cotton harvesting, Comparison of cotton harvesting processes. Effect of harvesting process on cotton quality. Process of Defoliation.		
<b>Unit III</b>	<b>Pre and Post ginning equipments</b>	<b>06 Hours</b>
Pre and post Ginning Process – Importance of pre and post ginning equipments. Objects of pre and post ginning equipments. Machines used as pre and post ginning process.		

<b>Unit IV</b>	<b>Cotton ginning process</b>	<b>07 Hours</b>
Introduction of ginning process, Objects of ginning, Types of ginning machines, Construction and working of different ginning machines.		
<b>Unit V</b>	<b>Parameters affecting ginning process</b>	<b>07 Hours</b>
Factors affecting ginning performance – Machine Factors, Agricultural Factors and Material Factors. Effect of ginning on fiber and yarn properties. Pressing and bailing of cotton – Importance, Method and characteristics of Indian bales.		
<b>Unit VI</b>	<b>Introduction to fibre opening and cleaning</b>	<b>05 Hours</b>
Importance of fibre opening and cleaning. Principles of fibre opening and cleaning. Factors affecting on fibre opening and cleaning. Methods of fibre opening and cleaning.		
<b>References Books:</b>		
<ol style="list-style-type: none"> <li>1. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein</li> <li>2. The Characteristics of Raw Cotton’ by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol.II, Part-I.</li> <li>3. ‘Opening and Cleaning’ by Shirley. The Textile Institute Publication, Manual of Cotton Spinning Vol. II, Part-II.</li> <li>4. Opening Cleaning and Picking’ by Dr.Zoltan S. Szaloki, Institute of Textile Technology, Virginia.</li> <li>5. ‘Cotton Ginning’ Textile Progress, The Textile Institute Publication.</li> <li>6. ‘Cotton Production and Blow Room’ By Dr. R. N. Narkhedkar, Research India Publication, Delhi.</li> <li>7. Essential calculations of practical cotton spinning by T.K. Pattabhiraman.</li> <li>8. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein.</li> </ol>		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. Textile Technology (Semester – I)**  
**01TTP155: Design Thinking and Drafting Lab**

Teaching Scheme: Practical: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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**Course Objectives:**

1. To introduce procedure for converting an idea into design.
2. To convert 2-dimensional views in to 3-dimensional view.
3. To convert 3-dimensional view from given 2-dimensional views.
4. To understand procedure for drawing development of solids such as cone, cylinder, prism and pyramid.

**Course Outcomes:**

At the end of the course, students will be able to

1. Generate ideas through design thinking.
2. Draw 2-dimensional views from the given pictorial 3-dimensional view.
3. Draw 3-dimensional view from given 2-dimensional views.
4. Draw Development of lateral surfaces of solids such as cone, cylinder, prism & pyramid.

**List of Experiments/ Practical's**

1. PPT presentation/Assignments on Design Thinking.
2. PPT presentation/Assignments on Applications of Design Thinking.
3. PPT presentation/Assignments on Case study on design thinking/ redesign/modular design/design for manufacturing and assembly.
4. Lines, Letterings & Dimensioning.
5. Projection of Lines, Auxiliary Plane Method.
6. Projection of Planes, Auxiliary Plane Method.
7. Projection of Solids, Auxiliary Plane Method.
8. Projection of Section of Solids, Auxiliary Plane Method.
9. Conversion of pictorial view into orthographic views.
10. Conversion of pictorial view into sectional orthographic views.
11. Isometric Projections.
12. Development and antidevelopment of lateral Surfaces of solids.

**Reference Books:**

2. Product Design and Development- Karl Ulrich, Steven Eppinger, Anita Goyal.
2. Engineering Design – George Dieter.
3. Engineering Drawing by N. D. Bhatt & V. M. Panchal.
4. Engineering Drawing by Venugopal.
5. Machine Drawing by N. D. Bhatt & V. M. Panchal.
6. Machine Drawing by K. L. Narayana, Kannaiah P., K. Venkata Reddy.

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester – I)**  
**01TTP156: Yarn Forming Technology– I Lab**

Teaching Scheme: Practical: 2 Hrs./Week	Credits 1	Evaluation Scheme: CIE: 50 Marks SEE: Marks
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**Course Objectives:**

1. Introduce the fibre properties, staple yarn spinning processes and basics of yarn numbering system.
2. Introduce the process and methods used for cotton cultivation and harvesting.
3. Introduce working principle, constructional details and factors affecting cotton ginning process.
4. Introduce the fibre opening and cleaning process.

**Course Outcomes:**

At the end of the course, students will be able to

1. Explain the fibre properties, staple yarn spinning processes and basics of yarn numbering system
2. Explain the process and methods used for cotton cultivation and harvesting.
3. Explain working principle, constructional details and factors affecting cotton ginning process.
4. Explain the fibre opening and cleaning process

**List of Experiments**

1. Layout of spinning work shop.
2. Study of different types of drives and calculations.
3. Study of various types of bearings used on spinning machines.
4. Process Flow chart for carded and combed yarn manufacturing.
5. Process Flow chart for Air jet, Rotor yarn manufacturing.
6. Testing of hank produced from Preparatory Machines.
7. Testing of hank produced from Spinning Machines.
8. Study of ginning machine: Construction, Working and driving calculations.
9. Calculation of machine cleaning efficiency.
10. Study of Blow-room line - Flow chart - Machine positioning in Blow-room.
11. Mill visit I - (Collection of different types of yarns).
12. Mill visit II.

**Reference Books:**

1. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein
2. The Characteristics of Raw Cotton' by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol.II, Part-I.
3. 'Opening and Cleaning' by Shirley. The Textile Institute Publication, Manual of Cotton



Spinning Vol. II, Part-II.

4. 'Opening Cleaning and Picking' by Dr.Zoltan S. Szaloki, Institute of Textile Technology, Virginia.
5. 'Cotton Ginning' Textile Progress, The Textile Institute Publication.
6. 'Cotton Production and Blow Room' By Dr. R. N. Narkhedkar, Research India Publication, Delhi.
7. Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
8. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein.

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester– I)**  
**01TTP157: IDEA LAB**

Teaching Scheme:  
Practical: 02 Hrs/Week

Credits  
01

Evaluation Scheme:  
CIE: 50 Marks

**Course Objectives:**

1. Understand social innovation concepts and approaches.
2. Identify new and unaddressed social needs.
3. Develop self-awareness concerned to social problems.
4. Design innovative solutions with social impact through application of new models of leadership, team work and creativity techniques.

**Course Outcomes:**

At the end of the course, students will be able to

1. Identify the problems faced by the society.
2. Generate different ideas through creativity and brainstorming.
3. Apply problem solving techniques to derive best solution.
4. Design and develop innovative solution to the social problems.

**List of Experiments**

1. Visit to the social sites for identification of social needs and community problems.
2. Understanding of the need, description, problem definition, social and economic constraints for affordable and appropriate technology.
3. Sessions on creativity, innovation and new product development
4. Demonstration of modern manufacturing facilities available at the institute
5. Demonstration of automation and programming tools.
6. Personal implementation of social awareness concerned to community problems
7. Active sessions on brainstorming, idea generation and problem-solving techniques
8. Mini project to develop solutions regarding social needs

**Reference Books:**

1. The Open Book of Social Innovation: Ways to Design, Develop and Grow Social Innovation, Paperback March, 2010 by Robin Murray, Julia Caulier-Grice, Geoff Mulgan
2. The Power of Social Innovation: How Civic Entrepreneurs Ignite Community Networks for Good, 1st Edition by Stephen Goldsmith, Michael R. Bloomberg, Gigi Georges, Tim Glynn Burke.
3. Social innovator series: ways to design, develop and grow social innovation, the open book of social innovation by robin murray julie caulier-grice geoff mulgan.
4. The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research Paperback by Frank Moulaert, Diana MacCallum.
5. Guide to Social Innovation by Johannes HAHN and Laszlo ANDOR7.

**Supplementary Readings:**

- <https://epdf.tips/the-power-of-social-innovation-how-civic-entrepreneurs-ignite-communitynetworks.html>
- <http://www.idmais.org/desislab/wp-content/media/social.pdf>

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester– I)**  
**01TTP158: Basic Computer Programming Lab**

Teaching Scheme: Practical: 2 Hrs/Week	Credits  1	Evaluation Scheme: CIE: 50 Marks
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**Course Objectives:**

1. To describe basic Computer architecture and generation of computer.
2. To explain advanced features of MS Office application
3. To illustrate scripting language and programming
4. To explain basic structure of 'C' programming formation and implementation

**Course Outcomes:**

At the end of the course, students will be able to

1. Understand basic of computer architecture and generation of computer.
2. Creating professional-quality documents using MS Office.
3. Design and implement web pages using scripting language.
4. Understand programming concept and develop simple application programs in 'C' programming language.

**List of Experiments**

1. Create a document in MS Word to study different ribbon tag.
2. Create spreadsheet application to manipulate numbers, formula, analysis and graphs in MS Office
3. Create a Power Point presentation application using Text, Image, Animation using MS Office
4. Study of basic formulation tag of HTML
5. Create a simple web page using List, Image, Hyperlink and Frame in HTML
6. Create a simple personal web page using HTML
7. Program for Addition, Subtraction, Multiplication, Division of two numbers using 'C' Language
8. Program for decision making statement –Nested if- Else and switch statement in 'C' Language
9. Program for different types of loops using 'C' Language
10. Program for one-dimensional array using 'C' Language
11. Program for two-dimensional array using 'C' Language
12. Program for graphics design using 'C' Language

**Reference Books:**

1. Fundamentals of Computers by V. Rajaram, PHI Publications.
2. HTML for beginners by Firuza Aibara
3. Let us C by Y.P. Kanetkar, BPB Publication
4. <https://support.microsoft.com/en-us/training>.

**First Year B. Tech - Textile Technology  
Semester-II**

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits
				L	T	P	Contact Hrs. /wk	
1	01TTL161	Mathematics and Statistics – II	BSC	3			3	3
2	01TTL163	Applied Mechanics	ESC	3			3	3
3	01TTL164	Electrical Technology	ESC	3			3	3
4	01TTL165	Industrial Chemistry	BSC	3			3	3
5	01TTL102	Fabric Forming Technology – I	PCC	3			3	3
6	01TTP162	Indian Traditional Textiles	IKS		2		2	2
7	01TTP166	Electrical Technology-Lab	AEC01			2	2	1
8	01TTP167	Industrial Chemistry-Lab	AEC01			2	2	1
9	01TTP168	Fabric Forming Technology - I Lab	VSEC			2	2	1
10	01TTP169	Professional Communication	AEC02		2		2	2
11	01TTI170	Democracy, Election and Good Governance (Audit)	IKS					
		<b>Total</b>		<b>15</b>	<b>4</b>	<b>6</b>	<b>25</b>	<b>22</b>

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester –II)**  
**01TTL161: Mathematics and Statistics- II**

Teaching Scheme: Lectures: 3 Hrs/Week	Credits  3	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. Prepare students to understand mathematical rules used for tracing Cartesian and Polar curves. Also, to prepare them for curve fitting using method of least square.
2. Prepare students with the multiple integrals and its applications. Also, to prepare them with complex numbers, Hyperbolic functions.
3. Prepare students with statistical methods so that they can understand analysis of bivariate data, correlation and regression.
4. Prepare students to understand probability, random variable and probability distributions. Also, to solve textile engineering problems using probability distributions.

**Course Outcomes:**

At the end of the course, students will be able to

1. Rules of tracing Cartesian and Polar curves. Also, they are able for trace curves.
2. The theory multiple integrals and its applications. Also, they are able to use the theory of complex numbers to separate real and Imaginary Parts.
3. Concept of bivariate statistical data, Correlation analysis and Regression analysis with examples.
4. The concept of random variable with type and probability distribution of random variable with types. Also, they are able to solve textile problems using Binomial, Poisson and Normal probability distributions.

**Course Contents**

Unit I	Curve Tracing & Curve fitting	07 Hours
Rules and examples of curve tracing in Cartesian and Polar Equations only, Fitting of curves: linear equation $y=a+bx$ , quadratic equation $y=a+bx+cx^2$ using least square method		
Unit II	Integral Calculus & Applications	08 Hours
Reduction formulae of sine and cosine functions, Gamma function, Beta Function (NO EXAMPLES), Multiple integrals: Introduction, solution of multiple integral also solution using change of order & Change of variables method. Application of integrals for finding Area, Mass of lamina up to double integrals only.		
Unit III	Complex Numbers	05 Hours
Introduction of Complex numbers, De Moivre's theorem, Circular, Hyperbolic and Inverse hyperbolic functions, Separation into real & imaginary parts.		

<b>Unit IV</b>	<b>Bivariate data</b>	<b>07 Hours</b>
Correlation: Definition, types, coefficient of correlation, properties & interpretation. Rank correlation coefficient & computation and interpretation. Regression: Regression concept and types. Lines of regression X on Y & Y on X, regression coefficients with properties & computation.		
<b>Unit V</b>	<b>Probability distribution</b>	<b>07 Hours</b>
Introduction of probability and its basic laws. Random variable: Definition, types. Introduction of probability distribution, types of probability distribution, pmf & pdf, expectation of random variable. MGF of random variable. Standard discrete probability distributions: Binomial probability distribution: Definition, properties, fitting & examples. Poisson probability distribution: Definition, properties, fitting & examples.		
<b>Unit VI</b>	<b>Standard continuous probability distributions</b>	<b>06 Hours</b>
Normal probability distribution: Definition, properties, standard normal distribution & examples. Chi-square probability distribution ( $\chi^2$ ): Definition & properties only. t-probability distribution: Definition & properties only. F- probability distribution: Definition & properties only. Introduction of statistical table for Z, t, $\chi^2$ , & F		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. A textbook of applied mathematics Vol.-I &amp; II by P.N. &amp; J.N. Wartikar</li> <li>2. Higher engineering mathematics by B.S. Grewal</li> <li>3. A textbook of applied mathematics by Bali, Saxena, Iyengar.</li> <li>4. Mathematical Statistics by J.E. Freund.</li> <li>5. Probability &amp; Statistics for engineers by Johnson.</li> <li>6. Statistical methods by Kumbhojkar.</li> </ol>		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester– II)**  
**01TTL163: Applied Mechanics**

Teaching Scheme: Lectures: 03 Hrs/Week	Credits  3	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To explain the concept of forces, couple and laws related to force with basic principles and theorems.
2. To analyze the concepts like static equilibrium, support reactions, friction and moment of inertia to solve basic engineering problems.
3. To analyze the effect of various types of forces on the bodies in dynamic equilibrium conditions to solve basic engineering problems.
4. To explain the concept of transmission of motion and power in various machines by using various drives, bearings and simple lifting machines used in textiles.

**Course Outcomes:**

At the end of the course, students will be able to

1. Use the concept of forces and various laws related to force with basic principles, theorems.
2. Use concepts like equilibrium, support reactions, friction and moment of inertia to solve basic engineering problems.
3. Analyze the effect of various types of forces on the bodies in dynamic conditions to solve basic engineering problems.
4. Interpret the concept of transmission of motion and power in various machines by using various drives, bearings and simple lifting machines used in textiles.

**Course Contents**

<b>Unit I</b>	<b>Fundamentals of statics</b>	<b>05 Hours</b>
Statics, dynamics, Force, system of forces, Resultant force and equilibrant, principle of transmissibility of force, moment of force. Couple, Law of parallelogram of forces, Varignon's theorem, Composition and resolution of Coplanar concurrent and non-concurrent forces.		
<b>Unit II</b>	<b>Equilibrium</b>	<b>10 Hours</b>
Equilibrium of Coplanar forces, Conditions of equilibrium, free body diagram, Lami's theorem. Friction: Introduction to friction, types of friction, Laws of friction. Cone of Friction. Beams: Types of beams, Types of Loads, Types of supports, Analysis of Simply supported beams.		
<b>Unit III</b>	<b>Moment of Inertia</b>	<b>06 Hours</b>
Centroid and Centre of gravity, Centroid of composite areas, Radius of Gyration, parallel axis theorem, perpendicular axis theorem, Moment of inertia of composite sections		

<b>Unit IV</b>	<b>Lifting Machines</b>	<b>04 Hours</b>
<p>Mechanical advantage, velocity ratio, efficiency, law of machine, effort lost in friction, load lost in friction, Study and numerical examples on simple machines- Simple screw jack, Simple axle and wheel, differential axle and wheel, worm and worm wheel.</p>		
<b>Unit V</b>	<b>Kinematics and Kinetics</b>	<b>08 Hours</b>
<p>Kinematics of Linear motion: Equations of linear motion with constant and variable acceleration, motion under gravity.                      Kinematics of Angular motion: Relation between angular motion &amp; linear motion, Equations of angular motion, Centrifugal &amp; centripetal forces, Motion along a curved path, Banking of roads.                      Kinetics: Newton's laws of motion, Mass moment of inertia, D'Alemberts principle, work, power, energy, impulse, Work- Energy Principle, Impulse- Momentum Principle, Principle of conservation of energy.</p>		
<b>Unit VI</b>	<b>Transmission of motion and power</b>	<b>06 Hours</b>
<p>Belt, rope, chain and gear drives, P.I.V. drives, Type of gears and gear drives, Gear trains, velocity ratio, advantages of gear drives, uses in textile machines, Concept of epicyclic gearing. Types of bearing and their applications (Only theory, no numerical examples on this topic)</p>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Engineering Mechanics by R. K. Bansal and Sanjay Bansal, Laxmi Publications</li> <li>2. Applied Mechanics by R.S. Khurmi, S. Chand Publications.</li> <li>3. Engineering Mechanics by S. S. Bhavikatti, New Age International Pvt. Ltd.</li> <li>4. Engineering Mechanics by S. Ramamrutham, DhanpatRai and Sons.</li> <li>5. Fundamentals of Engineering Mechanics by S. Rajasekaran, Sankarasubramanian, Vikas Publishing House.</li> <li>6. Applied Mechanics by S.N. Saluja, SatyaPrakashan, New Delhi.</li> <li>7. Engineering Mechanics by S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.</li> <li>8. Vector Mechanics for Engineers Vol. I &amp; II, by Beer &amp; Jonhstan, Tata Mc-Graw Hill Publication.</li> </ol>		



**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Frist Year B. Tech. (Textile Technology) (Semester II)**  
**01TTL164: Electrical Technology**

Teaching Scheme: Lectures: 3 Hrs/Week	Credits 03	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To understand basic concepts of Electrical and Magnetic circuits.
2. To understand concepts of elements and parameters in Single Phase circuit.
3. To understand concepts of elements and parameters in three phase AC circuits and Three phase Induction motor and Transformer.
4. To implement Electrical Protection and Safety devices and importance Energy Efficient Systems.

**Course Outcomes:**

At the end of the course, students will be able to

1. To solve and design Electrical and Magnetic circuit.
2. To solve and design Single phase A.C. circuit.
3. To distribute three phase Electrical energy and use of Induction motor and Transformer.
4. To implement Electrical Protection and Safety devices and importance Energy Efficient Systems.

**Course Contents**

<b>Unit I</b>	<b>Electrical Circuit</b>	<b>07 Hours</b>
Basic electrical quantities, Concept of E.M.F, Potential Difference, current, Resistance, Ohm's Law, Kirchoff's laws, mesh and node analysis, Energy conversations. Numericals.		
<b>Unit II</b>	<b>Magnetic Circuit</b>	<b>07 Hours</b>
Flux, flux density, Reluctance, field intensity, permeability, mmf, comparison of Electric and Magnetic circuit, leakage and fringing, B-H, Numericals on simple magnetic circuit		
<b>Unit III</b>	<b>Single phase A. C. circuit</b>	<b>06 Hours</b>
Faraday's Laws, Lenz's Law, self and mutual emfs, generation of sinusoidal E.M.F. in single phase alternator, R.M.S. & Average value, form factor, peak factor, Phasor representation, R-L, R-C, R-L-C series circuits, powers, power factor and its improvement capacitor method Numerical. Single line diagram.		
<b>Unit IV</b>	<b>Three Phase A. C. circuit and Induction Motor</b>	<b>07 Hours</b>
Introduction to three phase supply and its advantages, Generation of three phase A.C. voltage, balanced system, relation between line and phase quantities in star and delta its numerical. Three Phase Induction Motor Working Principle, Constructional Details, Types, Rotating Magnetic field, Necessity of starters, Speed Control by variable Frequency Drive (VFD) used in Ring frame, motors used in Textile Industry.		

<b>Unit V</b>	<b>Transformer</b>	<b>07 Hours</b>
Construction, operating principle, Types, EMF equation, Concept of Ideal and practical Transformer, Transformation Ratio, operation on No load and with load of ideal transformer, losses, efficiency, voltage regulation, its Numerical. Use in Textile Industry.		
<b>Unit VI</b>	<b>Electrical Protecting Devices.</b>	<b>05 Hours</b>
Importance of Earthing, Fuse (Rewirable and HRC), MCB. Construction of CFL, LED lamp, Introduction of Energy efficient system & EEM motors. Concept of Power Quality.		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Elements of electrical Engineering by U.A. Bakshi</li> <li>2. Electrical Technology by U.A. Bakshi</li> <li>3. Basic Electrical Engineering by B. H. Deshmukh</li> <li>4. A text book in electrical technology by B. L. Thareja.</li> <li>5. Fundamentals of Electrical Engineering by Ashfaq Husain</li> <li>6. Basic Electrical Engineering by Mehta V.K. &amp; Mehta Rohit</li> <li>7. Basic Electrical Engineering by J.B. Gupta</li> <li>8. Basic Electrical Engineering by DP Kothari, I J Nagrath</li> </ol>		
<b>Supplementary Readings:</b>		
<a href="https://nptel.ac.in">https://nptel.ac.in</a> <a href="https://easyengineering.net/basic-electrical-engineering-by-bakshi-nw/">https://easyengineering.net/basic-electrical-engineering-by-bakshi-nw/</a>		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester – II)**  
**01TTL165: Industrial Chemistry**

Teaching Scheme: Lectures: 03 Hrs/Week	Credits  03	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To select suitable advanced materials and various testing methods for analysis.
2. To select appropriate structural materials and polymers in industries and society.
3. To select proper metallic material and corrosion prevention methods in industries and society.
4. To analyze and troubleshoot the problems related to energy technology.

**Course Outcomes:**

At the end of the course, students will be able to

1. Select suitable advanced materials and various testing methods for analysis.
2. Select appropriate structural materials and polymers in industries and society.
3. Select proper metallic material and corrosion prevention methods in industries and society.
4. Analyze and troubleshoot the problems related to energy technology.

**Course Contents**

<b>Unit I</b>	<b>Purification and Testing Methods</b>	<b>07 Hours</b>
	Introduction, water quality parameters: pH, TS, TDS, Dissolved oxygen, Surface tension, Viscosity, Hardness of water: definition, types, units and numerical problems, Scale and Sludge formation, Caustic Embrittlement, Zeolite process, Ion exchange process, Reverse osmosis. Sublimation, Distillation, Solvent extraction, Determination of melting point and boiling point. Chromatography- Introduction, classification of chromatography, HPLC, GC, applications in textiles.	
<b>Unit II</b>	<b>Polymers</b>	<b>07 Hours</b>
	Introduction to polymers, Glass transition temperature (T <sub>g</sub> ), factors affecting T <sub>g</sub> . Thermo plastic and Thermosetting polymers, phenol formaldehyde and urea formaldehyde resins, Poly lactic acid. Self-healing polymers (Silicone rubbers). Conducting polymers (Synthesis of PANI) <b>Starch:</b> sources, properties of starch paste: soluble starch and dextrin, action of enzymes, manufacture of starch from maize, <b>Cellulose:</b> sources, chemical and physical properties.	

Unit III	Advanced Material	07 Hours
<p><b>Nanomaterials:</b> Introduction, classification of nanomaterials, Synthesis of nano-materials (Solution combustion and Sol-gel methods).</p> <p><b>Carbon nanotubes:</b> Introduction, types, synthesis by modified CVD method, applications.</p> <p><b>Graphene and Graphene Oxides-</b>Synthesis (Modified Hummer's method), fictionalization and applications.</p> <p><b>Borazene-</b> Structure and its applications.</p> <p><b>Piezoelectric materials:</b> Introduction and their applications.</p>		
Unit IV	Metallic Material & Corrosion	07 Hours
<p><b>Metallic Materials:</b> Introduction to metallic materials, alloys: definition, classification, purposes of making alloys, composition, properties and applications of ferrous alloys: plain carbon steels, stainless steel, nonferrous alloys: Brass, Bronze, Nichrome, Duralumin.</p> <p><b>Corrosion:</b> Introduction to corrosion, definition, causes, classification, types of oxide films on metal surfaces, atmospheric corrosion, electrochemical corrosion and mechanisms, factors affecting the rate of corrosion, prevention of corrosion by Cathodic protection, Galvanizing, Tinning, Metal spraying, Electroplating.</p>		
Unit V	Structural material	05 Hours
<p><b>Refractories:</b> Introduction and classification of refractories, Properties of refractories, Manufacturing of refractories, Refractory bricks- Zirconia, High -Alumina, Chromite.,</p> <p><b>Abrasives:</b> Introduction to abrasives, Natural abrasives- Diamond, Corundum, Emery, Garnets, Quartz. Artificial abrasives- Carborandom, Boron Carbide.</p> <p><b>Composite material:</b> FRP and GRP, processing of fibre reinforced composites. Glass wool.</p>		
Unit VI	Energy Technology	06 Hours
<p><b>Fuel:</b> Introduction, classification, characteristics of good fuel, determination of calorific value by Bomb and Boy's calorimeter, numerical problems.</p> <p><b>Battery:</b> Introduction, Classification of batteries- Primary, Secondary and Reserve batteries. Lithium Cell Batteries</p> <p><b>Solar Cells:</b> Introduction, working, photo electric effect.</p> <p><b>Fuel cells:</b> Introduction, classification, Alkaline fuel cell, Hydrogen – Oxygen fuel cell, and Phosphoric acid fuel cell.</p>		

### Reference Books:

1. A textbook, "Engineering Chemistry" (15th Ed.) by P. C. Jain & Monica Jain, Dhanpat Rai & Co.
2. Engineering Chemistry, S. S Dhara, 2013, S. Chand Publications, 4th Edition, ISBN: 812-1997658.
3. Engineering Chemistry, O.G.Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint 2017. ISBN: 978-0070146105.
4. "Industrial Chemistry" by A. K. Sharma, Goel Publishing House.
5. Polymer sciences and technology by Joel R. Fried.
6. "Engineering Chemistry" by O.G.Palanna, Tata McGraw Hill Education Pvt. Ltd.
7. Material science and metallurgy by C. Daniel Yesudian and D.G. Harris Samuel.
8. Analytical Chemistry by Garry D. Christian fifth edition.
9. A Text book of Material Science by V.K. Manchanda.
10. The Nanoscope by Dr. ParagDiwan& Ashish Bharadwaj.
11. Advanced Materials and Nanotechnology for Sustainable Energy and Environmental Applications, ISBN 978-3-0365-5229-3 (hardback); ISBN 978-3-0365-5230-9 (PDF) doi.org/10.3390/books978-3-0365-5230-9.
10. Polymer sciences and technology by Joel R. Fried.
11. Text book of polymer science by Fred W. Billmeyer, Jr.
12. Organic chemistry of high polymers by Lenz.
13. Fundamentals of polymers by Anilkumar and Rakesh K. Gupta.
14. Principles of Polymerisation by George Odian.
15. Introduction to polymer chemistry by G.S. Mishra.
16. Polymer science and technology of plastics & rubbers by Dr. Premamoy Ghosh.
17. Polymer Science by V.R. Gowarikar, N.V. Viswanathan&JaydevShreedhar.

### Supplementary Readings:

Smart Polymers and Their Applications-2<sup>nd</sup> Edition– Elsevier, Editor - Maria Rosa Aguilar Julio San Roman ISBN: 9780081024171.

<https://www.elsevier.com/books/smart-polymers-and-their-applications/aguilar/978-0-08-102416-4>.

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester-II)**  
**01TTL102: Fabric Forming Technology-I**

Teaching Scheme: Lectures: 03 Hrs/Week	Credits  03	Evaluation Scheme: SE 1: 25 Marks SE 2: 25 Marks SEE: 50 Marks
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**Course Objectives:**

1. To state the structure of textile industry in India and methods of fabric forming-weaving, knitting, nonwoven, braiding.
2. To explain motions of a plain loom, doobby, drop box and jacquard.
3. To identify the fabric weaves, construction of basic weaves, its derivatives, towel weaves.
4. To estimate weight of warp, weft, fabric warp cover, weft cover, fabric cover, loom production.

**Course Outcomes:**

At the end of the course, students will be able to

1. Explain the structure of textile industry in India and methods of fabric forming-weaving, knitting, nonwoven, braiding.
2. Describe motions of a plain loom, doobby, drop box and jacquard.
3. Illustrate the fabric weaves, construction of basic weaves, its derivatives, crepe, towel weaves
4. Calculate warp cover, weft cover, fabric cover, loom production, weight of warp, weft and fabric.

**Course Contents**

<b>Unit I</b>	<b>Introduction</b>	<b>06 Hours</b>
Introduction: 1. Nature of textile industry in India 2. Methods of fabric forming: - Weaving, knitting, braiding, nonwoven and their applications. 3. Weaving processes: Process flow charts of Grey, warp and weft stripes, checks fabrics.		
<b>Unit II</b>	<b>Fabric Forming</b>	<b>10 Hours</b>
1. Classification of weaving machines, passage of yarn through loom. 2. Objects of loom motions - primary, secondary and auxiliary. 3. Construction and working principle of loom motions - primary, secondary and auxiliary.		
<b>Unit III</b>	<b>Weaving Machine Mechanism</b>	<b>06 Hours</b>
1. Dobby shedding- Types, Construction and working principle, method of doobby design and pegging plan. 2. Jacquard Shedding- Types, Construction and working principle, figuring capacity, harness ties. 3. Multiple box motion- Types, Construction and working principle of 4x1 drop box motion, pattern chain.		

<b>Unit IV</b>	<b>Fabric Basic Weaves</b>	<b>09 Hours</b>
1. Construction of fabric- Definitions of warp, weft, end, pick, selvedge, yarn crimp. 2. Terminologies used for fabric- warp and weft float, weave repeat size 3. Elements of fabric weave- Methods of fabric weave representation, design, draft and peg plan, types of draft. 4. Basic weaves and its derivatives – Plain, twill and satin/sateen.		
<b>Unit V</b>	<b>Towel and Crepe Weaves</b>	<b>04 Hours</b>
1. Toweling weaves: Ordinary and brighten honeycomb, huck a back, mock leno. 2. Construction of crepe weave using different methods.		
<b>Unit VI</b>	<b>Weaving Numerical</b>	<b>04 Hours</b>
1. Loom production and efficiency calculations. 2. Calculations - Weight of warp, weft and fabric, warp and weft crimp, warp and weft cover, cloth cover, reed count		
<b>Reference Books:</b>		
1. Plain Weaving Motions by K.T. Aswani. 2. Fancy Weaving by K.T. Aswani 3. Principles of weaving by Marks A.T.C. & Robinson 4. Weaving machines, Mechanisms, Management by Talukdar, Sriramulu and Ajgaoankar 5. Watson's Textile Design and Colour by Z.J. Grosicki 6. Weaving Calculation by Sengupta		

<b>DKTES Textile and Engineering Institute, Ichalkaranji</b> <b>First Year B. Tech. (Textile Technology) (Semester –II)</b> <b>01TTP162: Indian Traditional Textiles</b>		
Teaching Scheme: Tutorial: 2 Hrs/Week	Credits 2	Evaluation Scheme: CIE: 50 Marks
<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. Explain fibres, yarns, fabrics, processing methods and apparels used in historical India.</li> <li>2. Explain the distinctiveness of Indian traditional textiles.</li> <li>3. Explain the historical and cultural influences on Indian traditional textiles.</li> <li>4. Explain importance of preserving and promoting Indian traditional textile techniques and their cultural heritage.</li> </ol>		
<b>Course Outcomes:</b> At the end of the course, students will be able to <ol style="list-style-type: none"> <li>1. Describe the distinctiveness of Indian traditional textiles.</li> <li>2. Analyse the historical and cultural influences on Indian traditional textiles.</li> <li>3. Explain importance of preserving and promoting Indian traditional textile techniques and their cultural heritage.</li> <li>4. Develop effective research and presentation skills through topics related to Indian traditional textiles.</li> </ol>		
Course Contents		
Unit I	Indian Traditional Fibres	3 Hours
Introduction to Indian traditional fibres. Plant fibres: cotton, jute, flax, hemp, etc., Animal fibres: wool, silk, camel hair, etc. Historical significance and cultural relevance of traditional fibres. Techniques and tools used for processing of traditional fibres. Properties and applications of traditional fibres.		
Unit II	Indian Traditional Yarns	3 Hours
Traditional spinning techniques: Hand spinning, Charkha, Takli, Drop spindle, etc. Different types of traditional yarns: handspun cotton, silk and woolen yarn. Evolution of yarn-making techniques in India. Role of yarns in Indian textile traditions and crafts. Applications of traditional yarns.		
Unit III	Indian Traditional Fabrics	4 Hours
Overview of Indian traditional fabrics. Handloom weaving techniques: Pit loom, Frame loom, Backstrap loom, etc. Region-wide variations in weaving styles and motifs. Muslin cloth. Historical and cultural significance of Indian traditional fabrics. Revival and preservation of traditional fabric techniques.		
Unit IV	Indian Traditional Dyeing and Printing	4 Hours
Introduction to Indian traditional dyeing and printing techniques. Natural dyeing methods: Indigo, Madder, Turmeric, Lac, etc. Traditional block printing: Bagru, Sanganer, Kalamkari, Ajrakh, etc. Tie and dye techniques: Bandhani, Leheriya, Patola, etc. Preservation and modern adaptations of traditional dyeing and printing techniques.		



<b>Unit V</b>	<b>Indian Ancient Costumes</b>	<b>4 Hours</b>
Male and female attire in Indus valley civilization, Vedic era, Maurya period, Kushan period, Chola period, Gupta period.		
<b>Unit VI</b>	<b>Costumes in Different Parts of India</b>	<b>6 Hours</b>
Speciality fabrics of different parts of India: Maheshwari, Banarasi, Jamdani, Paithani, Kota, Gadwal, Venkatgiri, Gharchola, Kanjeeveram, Batik, Barabanki, Dhoti, Lungi, Kurta Pajama, Shervani, Ghagra, Lehenga, Choli, Pagri, etc.		
<b>Reference Books:</b>		
1 Jasleen Dhamija, Handwoven Fabrics of India, Abhinav Publications, 2004, ISBN: 978-8170174342.		
2 Ritu Kumar, Costumes and Textiles of Royal India, Antique Collectors' Club, 2006, ISBN: 978-1851493174.		
3 B.N. Goswamy, Indian Costumes in the Collection of the Calico Museum of Textiles, Mapin Publishing, 2009, ISBN: 978-1890206842.		
4 K.R. Subanna, Indian Dyes and Dyeing Industry in the 18th and 19th Centuries, Manohar Publishers, 1999, ISBN: 978-8173042730.		
5 Jasleen Dhamija, Asian Embroidery, Brijbasi Art Press, 2003, ISBN: 978-8188230062.		
6 Rahul Jain, Indian Textiles: Past and Present, Aryan Books International, 2012, ISBN: 978-8173054085.		
7 Rta Kapur Chishti, Saris: Tradition and Beyond, Roli Books, 2012, ISBN: 978-8174369213.		
8 Martand Singh, Indian Embroideries, Roli Books, 2009, ISBN: 978-8174365055.		
9 Usha Balakrishnan, Carpets and Floor Coverings of India, Roli Books, 2010, ISBN: 978-8174367707.		
10 Manorama Bawa, Indian Cotton Textiles: Seven Centuries of Chintz from the Karun Thakar Collection, Prestel Publishing, 2013, ISBN: 978-3791352666.		

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Frist Year B. Tech. (Textile Technology) (Semester II)**  
**01TTP166: Electrical Technology Lab**

Teaching Scheme: Practical: 2 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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**Course Objectives:**

1. To understand basic concepts of Electrical and Magnetic circuits.
2. To understand concepts of elements and parameters in Single Phase circuit.
3. To understand concepts of elements and parameters in three phase AC circuits and Three phase Induction motor and Transformer.
4. To implement Electrical Protection and Safety devices and importance Energy Efficient Systems.

**Course Outcomes:**

At the end of the course, students will be able to

1. To solve and design Electrical and Magnetic circuit.
2. To solve and design Single phase circuit.
3. To distribute three phase Electrical energy and use of Induction motor and Transformer.
4. To implement Electrical Protection and Safety devices and importance Energy Efficient Systems.

**List of Experiments**

1. General Introduction to Electrical Engineering laboratory.
2. Verification of Ohm's Laws.
3. Verification of Kirchhoff's Current Law.
4. Verification of Kirchhoff's Voltage Law.
5. Determination of Power factor in ac circuit.
6. Determination of Resistance & Inductance of a coil.
7. Study of Phasor Relationship in R-L-C series circuit.
8. Verification of phase and line parameters in three phase system.
9. Determination of Efficiency and Regulation of Single Phase Transformer.
10. Study of different types of Earthing.
11. Study of different types of Protective devices.
12. Study of different types of lamps.

**Reference Books:**

1. Elements of electrical Engineering by U.A. Bakshi
2. Electrical Technology by U.A. Bakshi
3. Basic Electrical Engineering by B. H. Deshmukh

4. A text book in electrical technology by B. L. Thareja.
5. Fundamentals of Electrical Engineering by Ashfaq Husain
6. Basic Electrical Engineering by Mehta V.K. & Mehta Rohit
7. Basic Electrical Engineering by J.B. Gupta
8. Basic Electrical Engineering by DP Kothari, I J Nagrath

**Supplementary Readings:**

<https://nptel.ac.in>

<https://easyengineering.net/basic-electrical-engineering-by-bakshi-nw/>

**DKTES Textile and Engineering Institute, Ichalkaranji,  
First Year B. Tech. (Textile Technology) (Semester – II)  
01TTP167: Industrial Chemistry Lab**

Teaching Scheme: Practical: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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**Course Objectives:**

1. To select suitable advanced materials and various testing methods for analysis.
2. To select appropriate structural materials and polymers in industries and society.
3. To select proper metallic material and corrosion prevention methods in industries and society.
4. To analyze and troubleshoot the problems related to energy technology.

**Course Outcomes:**

At the end of the course, students will be able to

1. Select suitable advanced materials and various testing methods for analysis.
2. Select appropriate structural materials and polymers in industries and society.
3. Select proper metallic material and corrosion prevention methods in industries and society.
4. Analyze and troubleshoot the problems related to energy technology.

**List of Experiments (Any Twelve)**

1. Determination of total hardness of water by EDTA method.
2. Determination of chloride content of water by Mohr's method
3. Determination of dissolved oxygen of water.
4. Determination of total solids & suspended solids of water.
5. Separation and detection of cations by using Paper Chromatography.
6. Determination of viscosity of liquid samples by using Ostwald's viscometer.
7. Determination of the percentage composition of the given unknown mixture using Ostwald's viscometer by graphical method.
8. Preparation of urea-formaldehyde resin
9. Preparation of phenol-formaldehyde resin
10. Determination of the critical micelle concentration (CMC) of the given surfactant by surface tension measurement using a Stalagmometer.
11. Proximate analysis of starch.
12. Qualitative analysis of carbohydrates and proteins.
13. Estimation of copper in brass.
14. Determination of rate of corrosion of metal.
15. Demonstration of Daniel cell

16. Proximate analysis of solid fuel.
17. Purification of given compound by sublimation.
18. Purification of given compound by a simple distillation.
19. Extraction of soluble matter from cotton fabric using Soxhlet apparatus.

**Reference Books:**

1. Practical Chemistry by Dr. O.P. Pandey, D. N. Bajpai, Dr. S. Giri, under publication S. Chand & Company pvt. ltd.
2. Experiments and Calculations in Engineering Chemistry by S. S. Dara under S. Chand & Company pvt. ltd.
3. Profiles in analytical chemicals by Dr. N. F. Desai enlarge edition.
4. Analytical Chemistry by Garry D. Christian fifth edition.
5. Introduction to chemical engineering by Walter L. Badger, Juliust T. Banchemo.
6. Chemical information a practical guide to utilization by Yecheskel Wolman 2<sup>nd</sup> edition.
7. Instrumental methods of chemical analysis by Galen W. Ewing fifth edition under McGraw-Hill international editions.
8. Textbook of Quantitative Chemical Analysis by G. H. Jeffery, J. Bassett, J. Mendham, R. C Denny.
9. Vogel's text-book of practical organic chemistry by Brian S. Furniss, Antony J. Hannford, Peter W.G. Smith, Austin R. Tatchell fifth edition under Pearson publication.
10. Industrial Chemistry by B. K. Sharma under Goel publication house.
11. Vogel's quantitative inorganic analysis by G. Svehla, B. Sivasankar under Pearson publication.
12. Laboratory practice of organic chemistry by G. Ross Robertson, Thomas L. Jacobs fourth edition under Amerind publishing co. Pvt. Ltd.
13. Chemistry of water by Alla Appa Rao under New age international.
14. Textbook of Quantitative Chemical Analysis by G. H. Jeffery, J. Bassett, J. Mendham, R. C Denny.
15. Instrumental Methods of Chemical Analysis by G. Chatwal and S. Anand.

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester – II)**  
**01TTP168: Fabric Forming Technology- I Lab**

Teaching Scheme:  
 Practical: 02 Hrs./Week

Credits  
 01

Evaluation Scheme:  
 CIE: 50 Marks  
 SEE: Marks

**Course Objectives:**

1. To state the structure of textile industry in India and methods of fabric forming-weaving, knitting, nonwoven, braiding.
2. To explain motions of a plain loom, dobby, drop box and jacquard.
3. To identify the fabric weaves, construction of basic weaves, its derivatives, towel weaves.
4. To estimate weight of warp, weft, fabric warp cover, weft cover, fabric cover, loom production.

**Course Outcomes:**

At the end of the course, students will be able to

1. Explain the structure of textile industry in India and methods of fabric forming-weaving, knitting, nonwoven, braiding.
2. Describe motions of a plain loom, dobby, drop box and jacquard.
3. Illustrate the fabric weaves, construction of basic weaves, its derivatives, crepe, towel weaves
4. Calculate warp cover, weft cover, fabric cover, loom production, weight of warp, weft and fabric.

**List of Experiments**

1. Study of weaving preparatory and weaving process flow charts.
2. Study of passage of yarn through plain loom.
3. Study of primary motions on plain loom.
4. Study of secondary motions on loom.
5. Study of auxiliary motions on loom.
6. Study of climax dobby and pattern chain making.
7. Study of mechanical jacquard.
8. Study of drop box motion on loom.
9. Fabric structure: plain and its derivative.
10. Fabric structure: twill and its derivative.
11. Fabric structure: satin/sateen, toweling weave.
12. Mill visit for plain loom shed.

**Reference Books:**

1. Plain Weaving Motions by K.T. Aswani.
2. Fancy Weaving by K.T. Aswani
3. Principles of weaving by Marks A.T.C. & Robinson
4. Weaving machines, Mechanisms, Management by Talukdar, Sriramulu and Ajgaoankar
5. Watson's Textile Design and Colour by Z.J. Grosicki
6. Weaving Calculation by Sengupta

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester– II)**  
**01TTP169: Professional Communication**

Teaching Scheme: Tutorial: 2 Hrs/Week	Credits  2	Evaluation Scheme: CIE: 50 Marks
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**Course Objectives:**

1. Understand the importance of listening, speaking, reading and writing skills which are beneficial to enhance communication skill.
2. To acquaint the students with English phonology and make them practice correct Pronunciation.
3. To make them aware about effective writing skills along with accurate grammar and vocabulary.
4. To help them communicate effectively and to present their ideas confidently.

**Course Outcomes:**

At the end of the course, students will be able to

1. Apply the learnt knowledge of LSRW skills while communicating.
2. Comprehend English Sounds, stress pattern and intonation.
3. Compose formal letters, emails and job application with accurate grammar and vocabulary.
4. To exhibit oratorical skills by giving oral presentations.

**List of Experiments**

1. SWOT Analysis --Understanding self
2. Communicative Grammar
3. Communicative vocabulary
4. Drafting Simple application letter and E mail writing
5. Writing Effective Resume
6. Common Errors in pronunciation ( phonetics)
7. Interview techniques
8. Extempore
9. Formal presentation on given topic
10. Group Discussion

**Reference Books:**

1. Communication skills for Engineers by Sunita Mishra & C. Muralikrishna (Pearson)
2. Communication Techniques and Skills by R K Chaddha
3. Body Language by Allen Pease.
4. Speaking Effectively by Jeremy Comfort, Pamela Rogerson, Cambridge University Press

New Delhi

5. Soft Skills for Managers by Dr. T. KalyanaChakravarthi, Dr. T. LathaChakravarthi, Biztantra
6. Soft Skills for every one by Jeff Butterfield, Cengage
7. Professional communication skills by A.K. Jain, S.Chand
8. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan)

**Supplementary Readings:**

Language lab ---- softwares to enhance communication skill and pronunciation.

**SCHEME OF ASSESSMENT: CIE**

Submission – Completed Journal and assignments.

TUTORIALS	30 MARKS (Attendance, writing, performance)
ASSIGNMENTS	10 MARKS
ORAL	10 MARKS



**DKTES Textile and Engineering Institute, Ichalkaranji**  
**First Year B. Tech. (Textile Technology) (Semester- II)**  
**01TTI170: Democracy, Election and Good Governance**

Evaluation Scheme:  
 CIE: 50 Marks

**Course Objectives:**

1. By studying on their own, students will try to understand importance of democracy, election to local self-government bodies and good governance.

**Course Outcomes:**

At the end of the course, students will be able to

1. Answer questions related to democracy, election to local self-government bodies and good governance.

**Course Contents**

**Unit I**

**Democracy in India**

- Dimensions of Democracy: Social, Economic and Political
- Decentralization: Grassroots Level Democracy
- Challenges before Democracy: women and marginalized sections of the society

**Unit II**

**Election to Local Self Government Bodies**

- 73rd and 74th Constitutional Amendment Acts: Institutions at the local level and Role of State Election commission
- Local Body Elections: Urban & Rural
- Duties of an Individual towards electoral process

**Unit III**

**Good Governance**

- Meaning and concept
- Government and Governance
- Good Governance initiatives in India

**\* Students have to pass this subject by studying on their own & by securing minimum 20 marks out of 50, passing of this course is compulsory.**