

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

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

**DEPARTMENT: TEXTILES**

**CURRICULUM**  
**B. Tech. Fashion Technology Program**

**Second Year**

With Effect From

2017 - 2018



Promoting Excellence in Teaching  
Learning & Research

**Second Year B.Tech Fashion Technology  
Semester-I**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/Week	Tutorial Hrs/Week	Practical Hrs/Week	Total	
1	TFL201	FASHION ILLUSTRATION	B	3			3	3
2	TFL202	TEXTILE MATHEMATICS-III	A	3			3	3
3	TFL203	FABRIC STRUCTURE AND DESIGN	D	3			3	3
4	TFL204	FIBRE AND YARN TESTING	D	3			3	3
5	TFL205	TEXTILE MANUFACTURING - III	D	4			4	4
6	TFL206	PATTERN ENGINEERING-I	D	3			3	3
7	TFP207	FASHION ILLUSTRATION LAB	B			2	2	1
8	TFP208	FABRIC STRUCTURE AND DESIGN LAB	D			2	2	1
9	TFP209	FIBRE AND YARN TESTING LAB	D			2	2	1
10	TFP210	TEXTILE MANUFACTURING – III LAB	D			2	2	1
11	TFP211	PATTERN ENGINEERING-I LAB	D			2	2	1
12	TFL212	ENVIRONMENTAL STUDIES - I (Mandatory Audit)	C	2			2	2 Units
		Total		<b>21</b>	<b>0</b>	<b>10</b>	<b>31</b>	<b>24</b>

**Group Details**

- A: Basic Science
- B: Engineering Science
- C: Humanities, Social Science & Management
- D: Professional Core Courses & Professional Elective
- E: Free Elective
- F: Seminar/Training/ Project

**Second Year B. Tech.****TFL201: FASHION ILLUSTRATION**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. Explain difference between real and fashion figure proportions.
2. Demonstrate drawing of female, male and children fashion figures.
3. Demonstrate rendering of garments and accessories.
4. Describe flats and specs for women, men, and children.

**Course Outcomes**

At the end of the course students will be able to

1. Explain rules of fashion figure proportions.
2. Draw fashion figures.
3. Illustrate various types of fabrics and garments with appropriate draping & rendering technique.
4. Draw technical drawings for women, men, and children garments.

**Course Contents**

<b>Unit 1.</b>	<b>Figure Proportions:</b> Greek rules of body proportions. Real Figure versus fashion figure. 8 head theory, 10 head theory and 12 Head Theory. Robotised fashion figure. Tone mannequins. Fleshing out. Profile figure, Three-quarter turned figure. Proportional analysis of head and facial features: eyes, nose, mouth and ear. Hairstyles. Structural analysis of arm, hand, and leg.	<b>9 Hrs.</b>
<b>Unit 2.</b>	<b>Photograph to Fashion Fantasy:</b> Drawing from photographs: balance line, movement and balance, importance of center front, and angles. Attitude in poses. Stylization. Rotation and counter rotation of body. Multiple poses with a fixed upper body. Models on catwalk. Focus techniques: full shot, medium shot, knee shot, waist shot, close-up, extreme close-up and detail shot.	<b>6 Hrs.</b>
<b>Unit 3.</b>	<b>Drawing Male &amp; Kids Figure:</b> Proportions of male figure, male versus female figure, drawing male figures, Drawing hairstyle, difference between male and female gestures. Proportions as per children's age groups: Infants, Toddlers, Child, Teen.	<b>6 Hrs.</b>
<b>Unit 4.</b>	<b>Clothed figure:</b> Draping of folds on clothed figure. Basic body movements and main types of fabric folds: S-shaped, trap & closure, radial, direct thrust, flying & organ-pipe, compressed, fragmented, angular, and hanging folds. Flounces and ruffles. Flat folds and pleats. Giving volume to folds. Lacing & drawstrings.	<b>6 Hrs.</b>

<b>Unit 5.</b>	<b>Rendering:</b> Rendering skin tone. Rendering materials like denim, chiffon, satin, taffeta, gouache, gauze, net, velvet, knits, fur, silk, wool, etc. Rendering black garments. Rendering hairs. Rendering accessories: hats, shoes, scarves, bags, belts, gloves, sunglasses, etc.	<b>6 Hrs.</b>
<b>Unit 6.</b>	<b>Technical drawing of garments:</b> Tailor's dummy. Size measurement. Production or specification sheet. Fit & Silhouettes. Flats for women. Flats for men. Flats for children.	<b>6 Hrs.</b>

**Reference Books**

1. Fashion Sketchbook by Bina Abling (2012), Bloomsbury Publishing India Private Limited. ISBN: 1609012283.
2. Figure Drawing for Fashion Design by Elisabetta Drudi (2010), The Pepin Press. ISBN: 9054961503.
3. Figure Drawing for Men's Fashion by Elisabetta Drudi (2014), The Pepin Press. ISBN: 9054961554.
4. Fabric Texture and Patterns by Elisabetta Drudi (2008), The Pepin Press. ISBN: 9057681129.
5. Fashion Drawing: The basic principles by Anne Allen and Julian Seaman (2003), Batsford. ISBN: 0713470968.
6. Rendering Fashion, Fabric and Prints With Adobe Photoshop by Steve Greenberg and M. K. Colussy (2007), Pearson Education. ISBN: 8131709973.
7. Illustrating Fashion by Kathryn McKelvey and Janine Munslow (2007), Wiley-Blackwell Publication. ISBN: 1405139528.
8. Illustrating Fashion: Concept to Creation by Steven Stipelman (2010), Fairchild Books. ISBN: 1563678306.
9. Fashion Artist: Drawing Techniques to Portfolio Presentation by Sandra Burke (2013), Burke Publishing. ISBN: 0958273383.
10. Fashion Design Drawing and Presentation by Patrick John (1982), Batsford Ltd. ISBN: 0713435194.
11. Fashion Design Illustration (Women) by Patrick John (1993), Batsford Ltd. ISBN: 0713466227.
12. Fashion Design Illustration (Men) by Patrick John (1996), Batsford Ltd. ISBN: 0713466235.

**Second Year B. Tech.**  
**TFL202: TEXTILE MATHEMATICS-III**

<b>Teaching Scheme</b>	
Lectures	3 Hrs./Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To explain ordinary differential equation and solve problems. To apply ordinary differential equations for solving simple mechanical and electrical problems.
2. To explain linear differential equation and solve problems. To apply linear differential equations for solving simple mechanical and electrical problems.
3. To explain theory of large sample tests (Z-tests) with application in textiles. To explain theory of small sample tests ( $\chi^2$ , t and F-tests) with application in textiles.
4. To explain theory of estimation and theory of statistical quality control for process control and for lot control.

**Course Outcomes**

At the end of the course students will be able to

1. Solve problems related to ordinary differential equations and its applications
2. Solve linear differential equations and its applications.
3. Identify textile data for testing, test the hypothesis. Calculate and interpret large sample Z-tests. Calculate and interpret small sample t-tests. Calculate and interpret Chi-square and F-tests.
4. Apply estimation for unknown parameters. Evaluate and interpret process and lot control methods.

**Course Contents**

<b>Unit 1.</b>	<b>Differential equations of first order &amp; first degree:</b> Method of solving Exact, Non exact, Linear and Non-linear differential equations. Numerical solution of O.D. equations by Euler's method and Runge-Kuttamethod of fourth order.	<b>8 Hrs.</b>
<b>Unit 2.</b>	<b>Linear differential equations of n<sup>th</sup> order with constant coefficients:</b> - Methods of finding Solution of L.D. equations in the form $y = C.F. + P.I$ Cauchy's homogeneous linear differential equations with constant coefficients and their solution.	<b>7 Hrs.</b>
<b>Unit 3.</b>	<b>Applications of ordinary and linear differential equations:</b> Applications for solving simple electrical circuit problems and mechanical problems	<b>4 Hrs.</b>
<b>Unit 4.</b>	<b>Testing of hypothesis and Large sample tests</b> Introduction, Hypothesis, Statistic, Critical Region, Errors in testing, Level of Significance. Test for population mean, equality of population means. Population proportion & equality of population proportions.	<b>7 Hrs.</b>

<b>Unit 5.</b>	<b>Small sample tests and estimation</b> Test for population mean, equality of population means, population variance, equality of population variance. Test for goodness of fit and independence of attributes. Point Estimation, unbiased estimators of population mean and variance. Interval Estimation, Confidence Interval for population mean based on normal and 't' distributions.	<b>8 Hrs.</b>
<b>Unit 6.</b>	<b>Statistical quality Control</b> Process Control: Control charts, X-chart, R-chart, C-chart, np-chart, P-chart. Lot Control: AQL, LTPD, AOQ, AOQL, O.C. Curve, Single and Double sampling plans.	<b>5 Hrs.</b>

**Reference Books**

1. A Text Book of Applied Mathematics: by J.N. & P.N. Watarikar.
2. Higher Engineering Mathematics by B. S. Grewal.
3. A Text Book on Engineering Mathematics by Bali, Saxena&Iyengar.
4. Mathematical Statistics by J.Fruend.
5. Applied Statistics & Probability of Engineers by Montgomery &Runger
6. Probability & Statistics for Engineers by Johnson

**Second Year B. Tech.**  
**TFL203: FABRIC STRUCTURE AND DESIGN**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. Explain construction and application of various compound fabrics.
2. Explain color and weave effect.
3. Describe concepts of Fabric Engineering.
4. Explain application and principle of gauze and leno.

**Course Outcomes**

At the end of the course students will be able to

1. Analyze and construct compound fabrics.
2. Demonstrate color and weave effect.
3. Describe concepts of Fabric Engineering.
4. Describe construction of gauze and leno.

**Course Contents**

<b>Unit 1.</b>	Fabric engineering: fabric classification as per structure pierces formula for yarn diameter, cloth cover, cloth geometry of plain & twill fabrics, practical application of cloth geometry and cover factor.	<b>7 Hrs.</b>
<b>Unit 2.</b>	Bedford cords: plain faced - twill faced. Wadded - modifications. Welt piques: wadded piques - Loose back and fast back welts and piques, waved pique.	<b>7 Hrs.</b>
<b>Unit 3.</b>	Colour and weave effects: Examples of simple colour and weave effects, Stripe & check weave combination. Backed Fabrics: Warp and Weft back, wadded backed fabric. Extra warp and extra weft figuring. Extra warp and extra weft figuring with two colours.	<b>8 Hrs.</b>
<b>Unit 4.</b>	Double cloth: Object, Classification: - self stitched - face to back - back to face -Combination face to back and back to face stitched double cloth. Wadded double cloth - weft and warp Wadded double cloth - Center Warp & Weft Stitched double cloth. Interchanging double cloths, multilayer fabrics, open to double & triple width & tubular fabrics.	<b>9 Hrs.</b>
<b>Unit 5.</b>	Warp pile produced by - terry weaves, Face to face weaving, wire insertion methods. Weft pile: plain back - twill back velveteen, corduroy, Weft plush, Length, density and fastness of pile.	<b>5 Hrs.</b>
<b>Unit 6.</b>	Gauze & Leno: Principles, basic sheds, leno with flat steel doups And slotted doups, point draft or counter leno, applications.	<b>4 Hrs.</b>

**Reference Books**

1. Grosicki Z., "Watson's Textile Design & Color: Elementary weaves & Figure", Blackwell Science, Commerce place.

2. Grosicki Z., "Advanced Textile Design & Colour:", Blackwell Science, Commerce place.
3. H.Nisbet, "Grammar of textile Design", Tarporevala sons & Co. Pvt. Ltd.,
4. W.S. Murphy, "Textile weaving & Design", Abhishek Publications.
5. Marks & Robinson, " woven cloth construction"
6. J.E. Booth," Textile mathematics- vol-I & II"



**Second Year B. Tech.**  
**TFL204:FIBRE AND YARN TESTING**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To discuss technical significance of fibre and yarn properties.
2. To discuss the factors affecting fibre and yarn properties.
3. To explain principle and testing methodology of fibre properties.
4. To explain principle and testing methodology of yarn properties.

**Course Outcomes**

At the end of the course students will be able to

1. Understand technical significance of fibre and yarn properties.
2. Discuss factors affecting fibre and yarn properties.
3. Test and interpret results obtained for fibre properties.
4. Test and interpret the results obtained for yarn properties.

**Course Contents**

- Unit 1. A. Longitudinal dimensions (Fibre Length):** Concept, Technical significance of fibre length, Fibre length measurement – Oil plate method, Comb sorter method, Digital Fibrograph. **15 Hrs.**
- B. Transverse Dimensions (Fineness & Maturity):**  
 Fineness –Concept, Technical significance of fibre fineness, Measures of fibre fineness, Measurement of fineness –Gravimetric method, Airflow method  
 Maturity of cotton–Concept, Technical significance, Measures of maturity, Measurement of maturity – Caustic soda method
- Unit 2. Modern Fibre Testing Instruments:** High Volume Instrument & Advanced Fibre Information System. **3 Hrs.**
- Unit 3. Neps:** Definition, Importance, Testing of neps on AFIS **1 Hrs.**
- Unit 4. A. Linear density of yarn:** Concept, Count or Yarn number, Direct & indirect system of yarn numbering, Measurement of yarn number: Electronic weighing balance, Beesley balance. **5 Hrs.**

**B. Twist & Twist Measurement:** Concept, Terms and Definitions, Effect of twist on yarn and fabric properties, Measurement of twist – Untwist and twist method, Twist take-up method.

**Unit 5. A. Evenness of Yarn:** Concept, Causes of unevenness, Classification of variations, Effects of unevenness, Measures of irregularity: PMD, CV, Measurement of unevenness – Visual examination, Capacitance principle, Imperfections, Classimat faults,

**B. Hairiness in spun yarn:** Causes, Effects, Measurement of yarn hairiness- Photoelectric method

**Unit 6. Tensile properties of fibres and yarns** **8 Hrs.**

Importance, Terms and definitions, Stress-strain curve & its importance, Factors influencing tensile strength of textiles, Types of loading, Principles of tensile testing machines – Pendulum level principle, Strain gauge principle

**A. Fibre Strength:** Measurement of fibre strength: Single fibre strength – Instron, Bundle strength – Stelometer.

**B. Yarn Strength:** - Single yarn Strength, Lea Strength.

#### Reference Books

1. Principles of Textile Testing, J.E.Booth, CBS Publishers & Distributors, 1996.
2. Physical Properties of Textile Fibres, Morton &Hearle.
3. Physical Testing of Textiles, B. P. Saville.
4. Textile Testing- Fibre, Yarn and Fabric, ArindamBasu, Published by SITRA, Coimbatore.

**Second Year B. Tech.**  
**TFL205:TEXTILE MANUFACTURING - III**

<b>Teaching Scheme</b>	
Lectures	4 Hrs. /Week
Total Credits	4

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To explain fibre preparation and spinning preparatory process and calculations.
2. To describe yarn spinning process and calculations.
3. Explain modern weaving preparatory processes.
4. To describe automatic weaving, shuttle less weaving and non-woven fabric manufacturing.

**Course Outcomes**

At the end of the course students will be able to

1. Explain fibre preparation and spinning preparatory process and calculations.
2. Describe yarn spinning process and calculations.
3. Explain modern weaving preparatory processes.
4. Describe automatic weaving, shuttle less weaving and non-woven fabric manufacturing

**Course Contents**

<b>Unit 1.</b>	<b>Fibre preparation –</b> <b>Blow room:</b> Types and composition of trash in cotton, Objects of blow room Elements of blow room machines. Working of machines used in blow room. <b>Card:</b> Objects, basic actions in card, construction and working of card.	<b>7 Hrs.</b>
<b>Unit 2.</b>	<b>Spinning preparatory and Spinning -</b> <b>Draw frame:</b> Objects, Concepts of drafting & doubling, Working of draw frame. <b>Comber preparatory and comber:</b> Objects, Characteristics of good lap, Machine sequences and working of machines used for comber preparatory, Constructional details and working of comber. <b>Speed Frame:</b> Objects, constructional details and working of speed frame. <b>Ring Frame:</b> Objects, drafting, twisting & winding, constructional details and working of ring frame	<b>10 Hrs.</b>
<b>Unit 3.</b>	<b>Spinning calculations-</b> Cleaning efficiency%, production calculation on card, draw frame, comber, speed frame and ring frame.	<b>8 Hrs.</b>
<b>Unit 4.</b>	<b>Weaving preparatory –</b> <b>Winding:</b> Constructional details and features of modern winding machine. <b>Warping:</b> Classification, Features of modern warping machine.	<b>10 Hrs.</b>

**Sizing:** Features of modern sizing machine.

- Unit 5. Weaving -** **10 Hrs.**  
**Automatic Weaving:** Limitations of ordinary looms, types of Auto looms, applications of auto looms, fabric defects and remedies.  
**Shuttle less Weaving:** Classification, Weft insertion principle of Projectile, applications, selvedge weave, Principle of rapier weft insertion through various mechanisms such as single rapier, double rapier, rigid and flexible, bi-phase & twin rapier. Selvedge formation, Multicolour feeding mechanism, Field of application. Fabric defects and remedies
- Unit 6. Non Woven Fabrics -** **7 Hrs.**  
Types, different method of production of non woven such as needle punched, chemical & thermal bonded, applications of non woven fabrics.

**Reference Books**

1. 'The Technology of Short Staple Spinning' Vol I to IV by W.Klein
2. Blowroom Carding, Drawframe by Prof. A.R. Khare.
3. Ring frame & doubling by Prof. A. R. Khare.
4. 'Opening Cleaning and Picking' by Dr.Zoltan S. Szaloki
5. Principle of weaving by Marks A. T. C. & Robinson
6. Essential Calculations of Practical Cotton Spinning by T.K. Pattabhiraman.
7. Modern Preparation & weaving Machines by A. Ormerod.
8. Non-wovens by N. N. Bannerjee
9. Manual of Non-wovens by Dr. RadkoKrima
10. Shuttleless weaving by Svaty

**Second Year B. Tech.**  
**TFL206: PATTERN ENGINEERING-I**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To understand fundamentals of basic pattern making.
2. To explain procedure for designing with darts.
3. To develop the patterns for garment components.
4. To describe different types of garment closures.

**Course Outcomes**

At the end of the course students will be able to

1. Define the various pattern making tools and Develop basic five piece pattern set
2. Explain dart manipulation techniques and dart designing.
3. Illustrate and create the patterns for sleeve, collar, pockets, yokes and plackets
4. Describe and interpret garment closures and neckline finishing

<b>Course Contents</b>		<b>Hrs</b>
<b>Unit 1.</b>	<b>BASIC PATTERN MAKING:</b> Patternmaking Essentials for the Workroom, Form Measurements and Figure Analysis Function of Pattern Making Tools, Pattern Making Terms, Model form and measurements, Measurement Taking – Size chart and Measuring of Sizes. Concepts of seam allowance & production patterns	<b>06</b>
<b>Unit 2.</b>	<b>DRAFTING OF BASIC PATTERN SET:</b> Basic dress foundation, front and back bodice block, front and back skirt and sleeve, testing of fitting of basic blocks & correction.	<b>07</b>
<b>Unit 3.</b>	<b>DART MANIPULATION:</b> Introduction to darts and flat pattern making, Techniques of dart manipulation, Pivotal method & Slash & Spread method, Dart terminology, creating styles through dart manipulation.	<b>07</b>

<b>Unit 4.</b>	<b>DESIGNING WITH DARTS:</b>	<b>06</b>
	Introduction, Tuck darts, pleats, flares, gathers fullness, Dart clusters & dart equivalents, multiple darts. Importance of drill hole marks in the darts.	
<b>Unit 5.</b>	<b>DRAFTING OF GARMENT COMPONENTS:</b>	<b>07</b>
	<b>SLEEVES:</b> Introduction, sleeve terminologies, dart less sleeve pattern, adaptations for various types.	
	<b>COLLARS:</b> Introduction, collar terms, collar classification, basic shirt collar foundation, collar variations.	
	<b>YOKES:</b> Yokes for bodice, gathers, yokes design variations, gathers, flanges, pleat tucks & pin tucks.	
	<b>PLACKETS:</b> Pointed placket with facing-in-one, wing collar placket, slit opening with placket.	
	<b>POCKETS:</b> Pocket classification, outside pockets, seam pocket, jeans pocket, accordion pockets, stylized outside pockets, and pocket with hidden side seam.	
<b>Unit 6.</b>	<b>Introduction and construction techniques of garment closures:</b>	<b>06</b>
	Application of zippers-fly, kissing lap, button & button holes, hooks, and eye snaps. Velcro, eyelets, cords. Cuffs – Contoured cuffs, Roll-up Cuffs.	

#### Reference Books

1. Pattern making for fashion design by Helen Joseph Armstrong fifth edition, Pearson Education, Inc. ISBN-10: 0-13-606934-7
2. Pattern grading for women's clothes by Gerry Cooklin, Blackwell Publishing. ISBN 0-632-05692-4
3. Metric pattern cutting for women's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN: 978-1-118-37205-0
4. Metric pattern cutting for men's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN 978-81-265-3241-4
5. The art of fashion draping by connieamaden-crawford, third edition, Fairchild Publications, Inc. ISBN 81-8710-7359
6. Draping for fashion design by Hilde Jaffe and NurieRelis, fourth edition, Pearson Education, Inc. ISBN 978-81-317-2696-9

**Second Year B. Tech.****TFP207: FASHION ILLUSTRATION LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Study of human body proportions.
2. Drawing of 8 head, 10-head and 12-head fashion figure.
3. Drawing fashion figures from photographs.
4. Illustrate different types of focus techniques.
5. Drawing of male figure.
6. Drawing of children figure.
7. Illustrate different types of folds.
8. Rendering skin tone and hairs.
9. Rendering cotton, denim, chiffon, satin, fur, leather, lace, velvet and net.
10. Study of rendering accessories like hats, shoes, scarves, bags, belts, gloves, sunglasses, etc.
11. Draw flats for women.
12. Draw flats for men.

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFP208: FABRIC STRUCTURE AND DESIGN LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Fabric analysis: bedford cords pique.
2. Fabric analysis: extra warp fabric.
3. Fabric analysis: color and weave effects: checks.
4. Fabric analysis: stripe.
5. Fabric analysis: pile fabrics.
6. Fabric analysis: double cloth.
7. Fabric analysis: leno.
8. Sample weaving of bedford cloth.
9. Sample weaving of extra weft.
10. Sample weaving of double cloth.
11. Sample weaving of terry pile fabric.
12. Sample weaving of weft backed cloth.

**Submission**

1. Completed Journal



**Second Year B. Tech.**  
**TFP209 : FIBRE AND YARN TESTING LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
SEE	50
<b>Total</b>	<b>100</b>

**List of Experiments**

1. Fibre length measurement by Comb sorter method.
2. Fibre length measurement by grease plate method.
3. Fibre maturity measurement by caustic soda.
4. Measurement of fibre fineness by airflow instrument.
5. Measurement of fibre fineness by gravimetric principle.
6. Determination of fibre parameters by AFIS.
7. Determination of yarn number.
8. Determination of twist in single yarn.
9. Determination of twist in double yarn.
10. Determination of single thread strength.
11. Determination of lea strength.
12. Determination of evenness of yarn by cutting and weighing method

**Submission**

1. Completed Journal

**Second Year B. Tech.****TFP210: TEXTILE MANUFACTURING – III LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Study of constructional details of blow room bale opening and course cleaning machines.
2. Study of constructional details of blow room fine/intensive cleaning machines and chute feed system.
3. Study of constructional details of card and draw frame.
4. Study of constructional details of comber preparatory machines.
5. Study of constructional details of comber.
6. Study of constructional details of speed frame and ring frame.
7. Spinning of carded and combed yarn.
8. Comparison of carded and combed yarn.
9. Study of modern automatic winding machine.
10. General study of projectile weaving machine.
11. General study of flexible rapier weaving machine.
12. General study of rigid rapier weaving machine.
13. General study of cop changing automatic loom.
14. General study of shuttle changing automatic loom.
15. General study of dobby, drop box and jacquard.
16. Visit to modern warping and sizing unit.

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFP211: PATTERN ENGINEERING-I LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
SEE	50
<b>Total</b>	<b>100</b>

**List of Experiments**

1. Study of pattern making tools, stitching machine and measurements of dress form, live model and garment.
2. Machine practice to sew lines in various shapes, following a guide line on SNLS machine. (Paper exercise)
3. Machine practice to sew lines in various shapes, following a guide line on SNLS machine. (Fabric exercise)
4. Prepare samples for various seams and stitches.
5. Draft and stitch 5 piece patterns set and check for fit.
6. To develop patterns by using dart manipulation techniques.
7. Prepare and stitch patterns for graduated and radiating darts
8. Adopt and stitch patterns for puff and raglan sleeve.
9. Adopt and stitch patterns for collar with stand and peter pan collar
10. Draft and prepare sample for different types of cuffs.
11. Draft and prepare sample for patch and side pockets.
12. Draft and prepare samples for shirt placket and sleeve placket

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFL212: ENVIRONMENTAL STUDIES- I**

<b>Teaching Scheme</b>	
Lectures	2 Hrs. /Week
Audit Points	2

<b>Evaluation Scheme</b> <b>(Annual evaluation in Sem. IV)</b>	
SEE	70
CIE (Project)	30
<b>Total</b>	<b>100</b>

\*Evaluation of the course will be in Sem. IV based on syllabus of Sem. III and Sem. IV

### Course Objectives

1. Introduce students to multi-disciplinary nature of Environment sciences and its importance
2. To create awareness about present Environmental problems and their root causes
3. Understand action needed for environment conservation for present and future
4. Introduction to sustainability and resource conservation

### Course Outcomes

At the end of the course students will be able to

1. Explain various concepts in Environmental sciences
2. Describe collective responsibility towards conservatory approach
3. Explain importance of mass awareness and individual role in pollution prevention
4. Analyze social issues and local environmental problems and suggest solutions

	<b>Course Contents</b>	<b>Hrs.</b>
<b>Unit 1.</b>	<b>Nature of Environmental Studies</b> Definition, scope and importance, Multidisciplinary nature of environmental studies. Need for public awareness	<b>06</b>
<b>Unit 2.</b>	<b>Natural Resources and Associated Problems:</b> <b>Forest resources:</b> Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people. <b>Mineral resources:</b> Usage and exploitation, environmental effects of extracting and using mineral resources. <b>Food resources:</b> World food problem, changes caused by agriculture effects of modern agriculture, fertilizer-pesticide problems. <b>Energy resources:</b> Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. <b>Land resources:</b> Land as a resource, land degradation, man induced landslides soil erosion and desertification. Role of an individual in conservation of natural resources	<b>10</b>
<b>Unit 3.</b>	<b>Ecosystems:</b>	<b>10</b>

Concept of an ecosystem, Structure and function of an ecosystem.  
Producers, consumers and decomposers. Energy flow in the ecosystem,  
Ecological succession. Food chains, food webs and ecological pyramids.  
Introduction, types, characteristics features, structure and function of the  
following ecosystem - Forest ecosystem. Grassland ecosystem.  
Desert ecosystem. Aquatic ecosystems (Ponds, Lakes). Aquatic ecosystems  
(Lakes, Rivers). Aquatic ecosystems (Streams, Oceans, Estuaries).

**Reference Books**

1. Environmental Studies, Publisher Shivaji University Kolhapur
2. Environmental Studies, by Tiwari et al publisher IK International New Dehli
3. Environmental Studies by Dr. A Kaushik New Age International publisher New Dehli
4. Environmental Biology by KC Agarwal Nidi Pub. Ltd Bikaner
5. Ecology and Environment by PD Sharma Rastogi Publication Meerut
6. Essentials of Ecology, Townsend C., Harper, J. and Michael Begon, Blackwell Science (TB)

**Second Year UG Program in Fashion Technology  
Semester-II**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	TFL213	TEXTILE ELECTRONICS	B	4			4	4
2	TFL214	TEXTILE MATHEMATICS-IV	A	3			3	3
3	TFL215	YARNS AND FABRICS FOR FASHION	D	3			3	3
4	TFL216	CHEMICAL PROCESSING OF TEXTILES	D	3			3	3
5	TFL217	PATTERN ENGINEERING-II	D	3			3	3
6	TFL218	TESTING OF TEXTILES AND APPARELS	D	3			3	3
7	TFP219	TEXTILE ELECTRONICS LAB	B			2	2	1
8	TFP220	YARNS AND FABRICS FOR FASHION LAB	D			2	2	1
9	TFP221	CHEMICAL PROCESSING OF TEXTILES LAB	D			2	2	1
10	TFP222	PATTERN ENGINEERING-II LAB	D			2	2	1
11	TFP223	TESTING OF TEXTILES AND APPARELS LAB	D			2	2	1
12	TFP224	ENVIRONMENTAL STUDIES – II LAB	C		2		2	1 Unit
		<b>Total</b>		<b>19</b>	<b>2</b>	<b>10</b>	<b>31</b>	<b>24</b>

**Group Details**

- A: Basic Science
- B: Engineering Science
- C: Humanities, Social Science & Management
- D: Professional Core Courses & Professional Elective
- E: Free Elective
- F: Seminar/Training/ Project

**Second Year B. Tech.**  
**TFL213: TEXTILE ELECTRONICS**

<b>Teaching Scheme</b>	
Lectures	4 Hrs. /Week
Total Credits	4

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To explain the operation and applications of semiconductor devices, power semiconductor devices and electromechanical devices.
2. To describe working principle of different types of sensors and transducers.
3. To explain working of digital circuits, microprocessor, microcontroller and PLC
4. To demonstrate applications of electronics in textiles.

**Course Outcomes**

At the end of the course students will be able to

1. Describe operation and application of semiconductor devices, power semiconductor devices and electromechanical devices.
2. Explain working principle of different types of sensors and transducers.
3. Explain working of digital circuits, microprocessor, microcontroller and PLC
4. Demonstrate applications of electronics in textiles.

**Course Contents**

<b>Unit 1.</b>	<b>Basic Electronics and Semiconductor devices</b> Electronics components, passive components, resistors, capacitors and inductors Classification of materials- metals, insulators and semiconductors, intrinsic semiconductor, extrinsic semiconductors, p-n junction diode, junction theory, VI characteristics of p-n junction diode, use of diode in rectifiers, half wave rectifier, full wave rectifiers, performance of rectifiers, filters- shunt capacitor filter, series inductor filter, zener diode, zener regulator, diode specification. Construction, working of transistor, transistor configurations, common emitter characteristics, transistor amplifying action, Basic CE amplifier	<b>12 Hrs.</b>
<b>Unit 2.</b>	<b>Op-amp and power semiconductor devices</b> Op-amp- Introduction, block diagram, symbol, ideal op-amp, open loop op-amp configuration, Concept of feedback in amplifier, +ve and -ve feedback, op-amp with negative feedback, IC741-pinout and specifications SCR construction, operation, turning ON and OFF of SCR, SCR characteristics, Triac- Construction, working and characteristics, diac-	<b>10 Hrs.</b>

	Construction, working and characteristics, SCR in DC Motor speed control, AC power control using triac, power MOSFET, IGBT, power modules	
<b>Unit 3.</b>	<b>Transducers and electromechanical devices</b> Introduction, transducer classification – Primary and secondary transducers, active and passive transducers, analog and digital transducers, basic requirements of transducers Classification of optoelectronic devices- emitters, sensors, optocouplers; photodiode, phototransistor, LDR, photo voltaic cell, LED, optocouplers, optical shaft encoders Pressure measurement –bourdon tubes, bellows and diaphragms; Temperature Transducers – RTD, Thermocouple, Thermistors; Strain gauge- working principle, types; Linear variable differential transformers (LVDT), Capacitive transducers, Piezo electric transducers, proximity sensors Electromechanical Devices- Relay, Solenoid Valve	<b>12 Hrs.</b>
<b>Unit 4.</b>	<b>Digital Electronics</b> Difference between analog and digital electronics, digital gates, 4:1 multiplexer, 1:4 demultiplexer, 3:8 decoder, 8:3 encoder, level triggered RS flip flop, edge triggered D and JK flip flop, asynchronous up and down counter, 4-bit register, memory & its types	<b>8 Hrs.</b>
<b>Unit 5.</b>	<b>Microprocessor, Microcontroller and PLC</b> 8085 microprocessor features, pin diagram and architecture; 8051 microcontroller features, block diagram; PLC block diagram	<b>5 Hrs.</b>
<b>Unit 6.</b>	<b>Automation in Textiles</b> Automatic textile control systems- feedback, feed forward and combined; applications of electronics in spinning, weaving, testing and finishing	<b>5 Hrs.</b>

**Reference Books**

1. Electronics Components and Materials by Madhuri Joshi
2. A Textbook of Applied Electronics by R. S. Sedha
3. Basic Electronics by B. L. Therja
4. Electrical and Electronics Measurements and Instrumentation by A.K.Sawhey, DhanpatRia and Sons Pub.
5. Instrumentation Devices & Systems by C.S. Rangan, G.R. Sharma, TMH Pub
6. Op-amp and Linear Integrated Circuits by RamakantGaykwad
7. Digital Principles and applications by Malvino and leach
8. Microprocessor Architecture, Programming and applications with 8085 by Ramesh Gaonkar.
9. The 8051 Microcontroller Architecture, Programming and Applications by Kenneth J, Ayala.
10. Electronic Controls for Textile Machine – Hiren Joshi and Gouri Joshi, NCUTE
11. 8085 Microprocessor by Vibhute&Borole



**Second Year B. Tech.**  
**TFL214: TEXTILE MATHEMATICS-IV**

<b>Teaching Scheme</b>	
Lectures	3 Hrs./week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

- To explain Laplace transform & inverse of it with examples. To apply Laplace transform for solving L.D. equations
- To teach vector differentiation with examples. To define Fourier series and explain formulae and solve examples
- To demonstrate one way / two way analysis of variance with application in textiles
- To study design of experiment of various types with examples. To teach analysis of factorial experiment and draw conclusions

**Course Outcomes**

At the end of the course students will be able to

- Solve problems related to Laplace and inverse Laplace transforms. Solve problems of applications of Laplace transforms for L.D. equations.
- Solve problems of applications of Fourier series. Solve problems of applications of vector differentiation.
- Solve and interpret problems of one-way and two-way ANOVA. Solve and interpret problems of CRD, RBD and LSD
- Solve and interpret problems of two and three factor factorial experiments. Solve problems related to Laplace and inverse Laplace transforms.

**Course Contents**

<b>Unit 1.</b>	<b>Laplace Transforms and its application to L.D Equations</b> Definition, transforms of standard functions, transforms of derivatives, and integrals. Inverse Laplace transforms by partial fraction and convolution method. Application for L.D. equations, Method of solving L.D. equations with initial conditions (Boundary Values).	<b>8 Hrs.</b>
<b>Unit 2.</b>	<b>Vector differentiation</b> Differentiation of vector valued function of scalar 't', gradient, divergence, curl, directional derivative. 'Solenoidal' and 'Irrotational' vector fields.	<b>5 Hrs.</b>
<b>Unit 3.</b>	<b>Fourier Series</b> Definition, Euler's formulae, Conditions for Fourier expansions. Full range fourier series and half range expansions and their examples.	<b>6Hrs.</b>
<b>Unit 4.</b>	<b>Analysis of Multivariate Data</b> Multiple correlation coefficients. Partial correlation coefficients. Planes of regression.	<b>4 Hrs.</b>
<b>Unit 5.</b>	<b>Analysis of Variances:</b> Introduction, One-way analysis of variance, Two-way analysis of variance with and without repetition.	<b>8 Hrs.</b>
<b>Unit 6.</b>	<b>Basic designs and factorial experiments</b>	<b>8 Hrs.</b>

Introduction, Basic principles, Basic Designs (CRD, RBD & LSD).  
Introduction and types of factorial experiments,  $2^n$  factorial experiments,  $2^2$   
&  $2^3$  factorial experiments.

**Reference Books**

1. A textbook of applied mathematics Vol.-I & II by P.N. & J.N. Wartikar.
2. Higher engineering mathematics by B.S. Grewal.
3. A textbook of applied mathematics by Bali, Saxena&Iyengar.
4. Mathematical Statistics by J.E. Freund.
5. Probability & Statistics for engineers by Johnson.
6. Statistical methods by Kumbhojkar

**Second Year B. Tech.**  
**TFL215: YARNS AND FABRICS FOR FASHION**

<b>Teaching Scheme</b>	
Lectures	3 Hrs/ Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To classify types, structures and manufacturing of fancy yarns.
2. To explain requirements and manufacturing techniques of hosiery yarns sewing thread and embroidery thread.
3. To Describe principles of jet weft insertion and continuous weft insertion.
4. To explain the techno-economics of different shuttleless weaving and fabric inspection methods.

**Course Outcomes**

At the end of the course students will be able to

1. Illustrate the types, structure and manufacturing techniques of fancy yarns.
2. Describe the requirements and manufacturing techniques of hosiery yarns, sewing thread and embroidery thread.
3. Describe the weft insertion in Airjet, Waterjet, Circular, Multiphase and Tri-axial looms.
4. Explain the sample weaving process and fabric inspection systems.

	<b>Course Contents</b>	<b>Hrs.</b>
<b>Unit 1.</b>	<p><b>Fancy yarns –</b> Various types of fancy yarns - manufacturing techniques and structure - Slub yarn, multi twist, multi count yarn, Crep yarn, multi component fancy yarn, Rotor and Ring frame slub yarn, Blended Fancy yarns (mélange), SIRO, Bobtex yarn, chenille yarn.</p> <p>Elastane (polyurethane) Yarns and Air Covered Yarns- production of core / cover Lycra yarns on ring spinning and air covering machine. Applications of elastane yarn.</p>	<b>10</b>
<b>Unit 2.</b>	<p><b>Hosiery Yarns –</b> Requirements of hosiery yarn. Raw materials, parameters of Hosiery yarns. Properties and applications of hosiery yarns.</p>	<b>03</b>

<b>Unit 3.</b>	<b>Sewing Threads and Embroidery Yarn –</b> Introduction of Thread construction, Characteristics and production methods of sewing threads, Types of thread package, Thread storage & degradation. Introduction of thread construction, Raw material used, Characteristics of embroidery yarn, Thread production methods and types of thread package.	<b>08</b>
<b>Unit 4.</b>	<b>Jet Weft Insertion</b> Principles of Airjet weft insertion from single nozzle, confusor and multi nozzle airjet weaving machines and their elements, Take up, let off and Auxiliary motions. Water jet weft insertion system, Water consumption, quality and its requirement. Field of applications, commercial viability of Airjet and Waterjet weaving machines. Techno-economical ratings of different shuttleless technologies.	<b>10</b>
<b>Unit 5.</b>	<b>Multiphase, Circular and Tri-axial weaving:</b> Principle of Multiphase weaving, Passage of yarn, Study of Sulzer M8300 multiphase weaving machine, Field of applications. Principle of Circular weaving, Passage of yarn, Classification, Yarns used and field of applications. Principle of Tri-axial weaving, Properties and applications of tri-axial fabric, Yarns used.	<b>5</b>
<b>Unit 6.</b>	<b>Sample weaving and Fabric inspection</b> Concept of sample weaving. Importance of fabric inspection, Different fabric inspection systems	<b>3</b>

**Reference Books**

1. Fancy yarns –Their manufacture and application by R H Gong and R.M Wright, The textile institute -CRC- Wood head publishing limited.
2. 'Modern Yarns for Modern Fabrics Seminar' Conference proceedings. By TTI, The Textile Inst. Publisher.
3. Yarns & Fabric Classification Main Items in wool and blends, Italtex Editor.
4. Textile guide synthesis to create yarns & fabrics, Italtex Editor
5. 'Sewing Threads' Textile progress vol.30 no.3/4, by J.O. Ukponmwan, The Textile Inst. Publisher.
6. "Modern preparation and weaving" By A. Ormerod

7. “Weaving machines, mechanism, management” By Talukdar, AjagaokarSriramulu
8. “Shuttleless weaving” By Talav and Svaty
9. “Modern developments in weaving Machinery” By Duxbury
10. “Shuttleless weaving” by NCUTE programme by IITDelhi.
11. Brouchers and Machine pamphlets of various machine manufacturers
12. “airjet weft Insertion” By L. Vangheluwe, Textile Prograss

**Second Year B. Tech.****TFL216: CHEMICAL PROCESSING OF TEXTILES**

<b>Teaching Scheme</b>	
Lectures	3 Hrs / week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To describe the grey inspection and mechanical processing of textiles
2. To describe the pretreatments of textiles.
3. To explain the colouration processes of textiles like dyeing and printing.
4. To explain the objectives and effects of various finishes.

**Course Outcomes**

At the end of the course students will be able to

1. Understand the importance of grey inspection and mechanical processes
2. Understand the process of desizing, scouring, bleaching and mercerization
3. Understand the dyeing and printing colouration processes on cotton and polyester
4. Understand the objects and effects of various finishes.

**Course Contents**

<b>Unit 1.</b>	<b>GREY INSPECTION AND MECHANICAL PROCESSES</b>	<b>Hrs. 5 Hrs</b>
	Importance of grey inspection, Four point & ten point system & numerical for acceptance & rejection of fabrics, Defect analysis, Types of stitches, Inspection machines for woven and knit goods, Working of shearing and cropping machine, Objects of singeing. Working of Gas singeing machine. Gas singeing of woven & knitted fabrics. General process sequence	
<b>Unit 2.</b>	<b>DESIZING SCOURING</b>	<b>6 Hrs.</b>
	Object of desizing, methods and classification of desizing. Desizing of Cotton, P/C and Polyester fabrics, Evaluation of efficiency of desizing, Degumming of silk, Object of scouring, Concept of alkaline scouring, solvent scouring and bio scouring, Study of batch-wise & continuous methods of scouring, Scouring of cotton, blends and synthetic fabrics, evaluation of efficiency of scouring	
<b>Unit 3.</b>	<b>BLEACHING AND MERCERIZATION</b>	<b>9 Hrs.</b>
	Objects of bleaching, Introduction to bleaching agents like sodium hypochlorite and hydrogen peroxide, bleaching of cotton, blends and synthetics, batch & continuous machinery for bleaching of substrate in different forms, Bleaching of wool, silk, evaluation of efficiency of bleaching.	

Object of mercerization, Changes in cotton after mercerization, Study of machinery used for mercerization of yarn, woven and knit fabrics. Effect of various parameters on mercerization efficiency, Concept of hot mercerization & liquid ammonia treatment, Evaluation of mercerization efficiency using barium activity number

- Unit 4. DYEING:** **7 Hrs.**  
 Introduction to dyeing, classification of colouring matters,  
 Methods of dyeing: batch, semi-continuous and continuous process Dyeing of cellulosic fibres using direct, vat, reactive and sulphur dyes. Dyeing of polyester using disperse dye
- Unit 5. PRINTING:** **7 Hrs.**  
 Difference between dyeing and printing,  
 Styles of printing: Direct, discharge, resist style  
 Methods of printing: tie and dye, batik, block printing, screen printing.  
 Concept of transfer printing, digital printing  
 Printing of cotton by various styles using reactive dye,  
 Printing of polyester by various styles using disperse dye,  
 Pigment printing
- Unit 6. FINISHING PROCESSES** **5 Hrs.**  
 Objects of finishing, classification of finishes. Mechanical and chemical finishing, application of softeners,  
 Functional finishes: Resin finishing, flame retardant finish, antimicrobial finish  
 Heat setting and weight reduction of polyester material.

#### Reference Books

1. Chemical processing of textiles, NCUTE publication.
2. Chemistry and technology of fabric preparation and finishing by Dr. C. Tomasino, NCSU, USA
3. Introduction to Textile bleaching by J.T. Marsh.
4. Bleaching, Dyeing & Chemical Technology of textile fibres by E.R. Trotman.
5. Technology of Bleaching by V.A. Shenai.
6. Textiles Fiber to Fabric by Bernard P. Corbman.
7. Technology Of Dyeing by V.A. Shenai.
8. Textile Printing by L.W.C. Miles.
9. Technology of Finishing by V.A. Shenai.

**Second Year B. Tech.**  
**TFL217: PATTERN ENGINEERING-II**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To explain various style lines used in patterning.
2. To explain various garment components and stitching procedure for it.
3. To teach grading process and quality of garments
4. To explain fundamentals of draping and demonstrate draping procedure for basic blocks

**Course Outcomes**

At the end of the course students will be able to

1. Recognize various style lines and their aesthetical values in garments.
2. Describe various garments/components and their construction.
3. Apply grading procedure for various basic blocks and use patterning principles to correct pattern defects.
4. Demonstrate draping procedure for various basic blocks.

<b>Course Contents</b>		<b>Hrs</b>
<b>Unit 1.</b>	<b>Stylelines</b> – Introduction to style lines, The Classic Princess Style line, Armhole Princess Style line, The Panel Styleline <b>Cowls</b> – Introduction to Cowls, Types of cowls, Preparing patterns for Back Cowls, Armhole Cowls, Pleated Cowls, Exaggerated Cowls, Inset Cowls	<b>08</b>
<b>Unit 2.</b>	<b>Skirts/Circles and Cascades</b> – Types of skirts, skirt lengths, Drafting of flared skirts, gored skirts, godets, wrap skirts, circles, peplums and cascades, skirts with uneven hemlines	<b>07</b>
<b>Unit 3.</b>	<b>Dresses without Waistline Seams-</b> torso foundation, dress categories, three basic dress foundations, styleline foundation, pattern making problems.	<b>06</b>
<b>Unit 4.</b>	<b>Grading</b> – Introduction to grading, General principles, Grade Rules, Zero Point and Cardinal Points, Methods of grading: Track grading and nested grading, Grading the basic block and basic skirt, grading of sleeves and collars	<b>06</b>



- Unit 5. Draping** – Draping terminologies, Preparation of fabric for draping, Elements of fabrics, Principles and fitting methods, Basic Bodice draping, basic skirt draping, draping of sleeves and collars **06**
- Unit 6. Pattern Quality Analysis** – Relationship between pattern making and quality of the garment, Factors affecting pattern quality, Introduction to computerized pattern making, computerized grading, study of available software for pattern making **06**

**Reference Books**

1. Pattern making for fashion design by Helen Joseph Armstrong fifth edition, Pearson Education, Inc. ISBN-10: 0-13-606934-7
2. Pattern grading for women's clothes by Gerry Cooklin, Blackwell Publishing. ISBN 0-632-05692-4
3. Metric pattern cutting for women's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN: 978-1-118-37205-0
4. Metric pattern cutting for men's wear by Winifred Aldrich, Blackwell Publishing. 5th edition, ISBN 978-81-265-3241-4
5. The art of fashion draping by connieamaden-crawford, third edition, Fairchild Publications, Inc. ISBN 81-8710-7359
6. Draping for fashion design by Hilde Jaffe and NurieRelis, fourth edition, Pearson Education, Inc. ISBN 978-81-317-2696-9

**Second Year B. Tech.**  
**TFL218: TESTING OF TEXTILES AND APPARELS**

<b>Teaching Scheme</b>	
Lectures	3 Hrs. /Week
Total Credits	3

<b>Evaluation Scheme</b>	
SE-I	25
SE-II	25
SEE	50
<b>Total</b>	<b>100</b>

**Course Objectives**

1. To discuss significance of fabric and apparel properties.
2. To discuss the factors affecting fabric and apparel properties.
3. To explain principle and testing methodology of fabric properties.
4. To explain principle and testing methodology of apparels and accessories.

**Course Outcomes**

At the end of the course students will be able to

1. Understand significance of fabric and apparel properties.
2. Discuss the factors affecting fabric and apparel properties.
3. Test fabric properties and interpret results.
4. Test apparels and accessories and interpret results.

**Course Contents**

<b>Unit 1.</b>	<b>Classification of fabric Properties, Sampling of Fabrics</b>	<b>1 Hrs.</b>
<b>Unit 2.</b>	<b>Dimensional characteristics</b> Length, Width, Thickness, EPI and PPI, Thread count, Fabric weight - Weight per unit length, Weight per unit area, Crimp of yarn in fabric, Effect of crimp on the fabric properties, Measurement of crimp, Fractional cover factor, Cloth cover factor.	<b>4 Hrs.</b>
<b>Unit 3.</b>	<b>Mechanical Properties of Fabric</b> <b>A. Fabric Strength</b> Terminology and definitions. Tensile strength testing – Ravelled strip test, Cut strip test, Grab test, comparison of strip test & grab test, Fabric assistance, Tear strength testing – Elmendorf tearing strength tester, Impact principle - Ballistic test, Bursting strength test. <b>B. Abrasion Resistance of Fabric</b> Serviceability, wear, abrasion, assessment of abrasion damage, BFT abrasion testing machine, Martindale abrasion tester.	<b>10 Hrs.</b>

**C. Pilling of Fabrics**

Definition, Mechanism of pilling, Factors responsible for pilling, ICI Pill Box Tester.

**Unit 4. Aesthetic Properties of Fabric 5 Hrs.****A. Fabric Handle, Stiffness, Drape**

Concept- fabric hand, Objective & subjective evaluation of textiles, Measurement of Stiffness- Shirley stiffness tester, Heart-loop test, Measurement of drape- Drape meter.

**B. Crease Resistance & Crease Recovery**

Definitions: Crease, Wrinkle. Measurement of crease recovery - Recovery angle, TBL method.

**C. Luster**

Concept of luster, Subjective aspects of luster, measurement of luster, Effect of fabric construction on luster.

**Unit 5. Comfort Properties of Fabric 5 Hrs.****A. Air Permeability**

Definitions - Air permeability, Air resistance, Air porosity, Shirley air permeability tester.

**B. Water-Fabric Relations**

Water permeability and Water repellency, Basic concepts of Wetting and Water repellency, Methods of measuring water repellency in fabrics- Wetting time test, Spray test, Drop penetration test, Hydrostatic head test., Water vapour transmission: Concept and measurement.

**Unit 6. Apparel Testing 14 Hrs.**

- i. Assessment of fabric quality for apparels - KAWABATA & FAST techniques.
- ii. Dimensional properties of apparel fabrics: Relaxation shrinkage, Felting shrinkage, Swelling shrinkage, Contraction.
- iii. Snagging.
- iv. Sewability of fabrics: Seam strength, Seam efficiency, Seam pucker, Seam slippage, Needle cutting / Yarn severance, Seam appearance
- v. Bow and Skewness

- vi. Testing of Accessories: Fusible interlinings, Zippers, Elastic waistband, Sewing threads, Buttons.

### Reference Books

1. Principles of Textile Testing, J.E.Booth, CBS Publishers & Distributors, 1996.
2. “Hand book of Textile Testing”, Sundaram V, CTRL Publication, Bombay.
3. An Introduction to Quality Control for Apparel Industry, Pradip Mehta.
4. Managing Quality in the Apparel Industry, New age international (P), Ltd. Publishers, Pradip Mehta & Satish Bhardwaj.
5. Quality Control and Testing, V.K.Kothari.
6. Handbook of Indian Standards.

**Second Year B. Tech.**  
**TFP219: TEXTILE ELECTRONICS LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
SEE	50
<b>Total</b>	<b>100</b>

**List of Experiments**

1. Forward and reverse bias characteristics of diode.
2. Half wave rectifier (with and without filter).
3. Full wave rectifier (with and without filter).
4. Reverse characteristics of zener diode.
5. Op-amp inverting and non-inverting amplifier.
6. AC power control using triac.
7. LDR characteristics.
8. Speed measurement using optical and magnetic pickups.
9. RTD characteristics
10. Weight measurement using strain gauge.
11. Realization of digital gates
12. 8085 assembly language program

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFP220: YARNS AND FABRICS FOR FASHION LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs/ Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Manufacturing of Hosiery yarn and warp yarn on the ring spinning machine.
2. Manufacturing of elastic core cover yarn on ring frame and air covered fancy yarn on air covering machine.
3. Manufacturing of fancy yarns on hollow spindle winder.
4. Manufacturing of slub yarn, multi count yarn & multi twist yarn on ringframe.
5. Manufacturing of fancy yarn using SIRO spinning.
6. Mill visit to the fancy yarn manufacturing unit.
7. General study of Airjet weaving machine.
8. Weaving on Airjet loom by changing parameters.
9. Sample warping and weaving..
10. Visit to Airjet weaving unit.
11. Visit to Circular weaving unit.
12. Visit to shuttleless weaving unit for fabric inspection and its importance.

**Submission**

1. Completed Journal

**Second Year B. Tech.****TFP221: CHEMICAL PROCESSING OF TEXTILES LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs / Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
SEE	-
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Acid and enzymatic desizing of Cotton fabrics.
2. Batch wise alkaline scouring of cotton fabric and P/C blend.
3. Peroxide bleaching of Cotton fabrics
4. Mercerization of cotton hank
5. Dyeing of cotton with direct dye.
6. Dyeing of cotton with vat dye.
7. Dyeing of cotton with reactive dye.
8. Dyeing of cotton with sulphur dye.
9. Dyeing of 100% polyester with disperse dye by using HTHP beaker dyeing machine.
10. Direct style of printing on cotton with reactive dye
11. Discharge and Resist style of printing on cotton with reactive dye
12. Direct and discharge style of printing on PET with disperse dye
13. Resin finishing of garment
14. Softening treatments on garment.

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFP222: PATTERN ENGINEERING-II LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
SEE	50
<b>Total</b>	<b>100</b>

**List of Experiments**

1. Draft and stitch pattern for classic princess style line using two-dart basic block pattern
2. Draft and stitch pattern for pleated shoulder cowl using the basic front pattern block
3. Draft and stitch pattern for 6-gore flared skirt.
4. Draft and stitch torso foundation for dresses without waist line seam.
5. Grade a basic block of size 8 to size 6
6. Grade a skirt of size 12 to size 6
7. Draft and stitch pattern for godets
8. Prepare muslin fabric for draping and drape a basic bodice on the body form.
9. Prepare muslin fabric for draping and drape any skirt on the body form.
10. Prepare muslin fabric for draping and drape shawl collar on the body form.
11. Prepare muslin fabric for draping and drape convertible collar on the body form
12. Study of fabric manipulation techniques and stitch sample for any one.

**Submission**

1. Completed Journal



**Second Year B. Tech.**  
**TFP223: TESTING OF TEXTILES AND APPARELS LAB**

<b>Teaching Scheme</b>	
Practical	2 Hrs. /Week
Total Credits	1

<b>Evaluation Scheme</b>	
CIE	50
<b>Total</b>	<b>50</b>

**List of Experiments**

1. Determination of fabric tensile strength and elongation.
2. Determination of fabric tear strength.
3. Measurement of air permeability of fabric.
4. Determination of fabric stiffness.
5. Determination of fabric drape.
6. Determination of fabric crease recovery angle.
7. Assessment of abrasion resistance.
8. Assessment of pilling propensity.
9. Measurement of fabric stretch-ability and recovery.
10. Seam strength testing.
11. Dimensional stability of woven and knitted fabrics.
12. Testing of zippers.

**Submission**

1. Completed Journal

**Second Year B. Tech.**  
**TFP224: ENVIRONMENTAL STUDIES- II LAB**

<b>Teaching Scheme</b>	
Lect/ Tut/ Proj	2 Hrs. /Week
Audit Points	1

<b>Evaluation Scheme</b>	
Based on syllabus of Sem. III & Sem. IV	
SEE	70
CIE (Project)	30
<b>Total</b>	<b>100</b>

**Course Objectives**

1. Introduce students to multi-disciplinary nature of Environment sciences and its importance
2. To create awareness about present Environmental problems and their root causes
3. Understand action needed for environment conservation for present and future
4. Introduction to sustainability and resource conservation

**Course Outcomes**

At the end of the course students will be able to

1. Explain various concepts in Environmental sciences
2. Describe collective responsibility towards conservatory approach
3. Explain importance of mass awareness and individual role in pollution prevention
4. Analyze social issues and local environmental problems and suggest solutions

	<b>Course Contents</b>	<b>Hrs.</b>
<b>Unit 1.</b>	<b>Biodiversity and its Conservation:</b> Introduction - Definition: genetic, species and ecosystem diversity, Bio-geographical classification of India. Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation. Western Ghat as a bio-diversity region. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	<b>06</b>
<b>Unit 2.</b>	<b>Environmental Pollution:</b> Definition: Causes, effects and control measures of Air pollution. Water pollution. Soil pollution, Marine pollution. Noise pollution. Thermal pollution & Nuclear hazards. Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.	<b>10</b>
<b>Unit 3.</b>	<b>Social Issues and the Environment:</b> Disaster Management: Floods, earthquake, cyclone and landslides. Tsunami. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental Ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products. Environmental Protection and Projectwork	<b>10</b>

From Unsustainable to sustainable development. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth.

### Reference Books

1. Environmental Studies, Publisher Shivaji University Kolhapur
2. Environmental Studies, by Tiwari et al publisher IK International New Dehli
3. Environmental Studies by Dr. A Kaushik New Age International publisher New Dehli
4. Environmental Biology by KC Agarwal Nidi Pub. Ltd Bikaner
5. Ecology and Environment by PD Sharma Rastogi Publication Meerut
6. Environmental management, Wagner K.D., 1998, W.B. Saunders Co. Philadelphia, USA 499p.
7. Essentials of Ecology, Townsend C., Harper, J. and Michael Begon, Blackwell Science (TB)
8. Environmental Chemistry by SC Santra, *Published by* New Central Book Agency Kolkata