

# **SYLLABUS**

**Uttar Pradesh Textile Technology Institute, Kanpur**

**Affiliated to**

**DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**



**PROPOSED STUDY & EVALUATION SCHEME  
FOR  
2<sup>ND</sup> B. TECH. TEXTILE TECHNOLOGY**

**On**

**AICTE B. Tech Model Curriculum Structure &  
Syllabus**

**(Effective from the Session: 2023-24)**

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup>Year B. Tech Textile Technology**  
**Uttar Pradesh Textile Technology Institute, Kanpur**  
**Affiliated to**

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year III-Semester**

**Effective from Session-2023-24**

| Sl. No. | Subject Codes   | Subject                                      | Periods   |          |          | Evaluation Scheme |            |            |            | End Semester |            | Total       | Credit    |
|---------|-----------------|--|-----------|----------|----------|-------------------|------------|------------|------------|--------------|------------|-------------|-----------|
|         |                 |  | L         | T        | P        | CT                | TA         | Total      | PS         | TE           | PE         |             |           |
| 1       | BAS303          | Math IV                                      | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 2       | BVE301          | Universal Human Values & professional Ethics | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 3       | BTT301          | Yarn Manufacturing-I                         | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 4       | BTT302          | Fabric Manufacturing-I                       | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 5       | BTT303          | Textile Fibre-I                              | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 6       | BTT351          | Yarn Manufacturing-I Lab                     | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 7       | BTT352          | Fabric Manufacturing-I Lab                   | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 8       | BTT353          | Textile Fibre-I Lab                          | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 9       | BCC301          | Cyber Security                               | 2         | 0        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 2         |
| 10      | BCC351          | Internship Assessment / Mini Project*        | 0         | 0        | 0        |                   | 100        | 100        |            |              |            | 100         | 2         |
| 11      | BVE351 / BVE352 | Sports and Yoga-II/ NSS-II                   | 0         | 0        | 3        |                   |            |            | 100        |              |            | 100         | 0*        |
|         |                 | <b>Total</b>                                 | <b>15</b> | <b>5</b> | <b>6</b> | <b>120</b>        | <b>160</b> | <b>280</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>1000</b> | <b>25</b> |

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup> Year B. Tech. Textile Technology**  
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**2<sup>nd</sup> Year IV-Semester**

**Effective from Session-2023-24**

| Sl. No.  | Subject Codes   | Subject                                      | Periods   |          |          | Evaluation Scheme |           |            |            | End Semester |            | Total      | Credit    |
|--|-----------------|--|-----------|----------|----------|-------------------|-----------|------------|------------|--------------|------------|------------|-----------|
|  |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
|  |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
| 1  | BOE411          | Polymer Science and Technology               | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 2  | BAS401          | Technical Communication                      | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 3  | BTT401          | Yarn Manufacturing-II                        | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 4  | BTT402          | Fabric Manufacturing-II                      | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 5  | BTT403          | Textile Fibre-II                             | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 6  | BTT451          | Yarn Manufacturing-II Lab                    | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 7  | BTT452          | Fabric Manufacturing-II Lab                  | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 8  | BTT453          | Textile Fibre-II Lab                         | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 9  | BCC402          | Python Programming                           | 2         | 0        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 2         |
| 10   | BVE451 / BVE452 | Sports and Yoga-II/ NSS-II                   | 0         | 0        | 3        |                   |           |            | 100        |              |            | 100        | 0*        |
|  |                 | <b>Minor Degree/ Honors Degree MT1/ HT-1</b> |           |          |          |                   |           |            |            |              |            |            |           |
|  |                 | <b>Total</b>                                 | <b>15</b> | <b>5</b> | <b>9</b> | <b>120</b>        | <b>60</b> | <b>180</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>900</b> | <b>23</b> |
| * The Mini Project or internship (4 weeks) will be done during summer break after 4th Semester and will be assessed during V semester. |                 |  |           |          |          |                   |           |            |            |              |            |            |           |

## 3<sup>rd</sup> Semester B. Tech. Textile Technology

### 1.0 BAS 303: Mathematics-IV Probability & Statistics (L T P 3 1 0) Credit 4

Pre-requisites (if any): Knowledge of Mathematics I and II of B. Tech or equivalent

#### Course Outcomes

The objective of this course is to familiarize the students with partial differential equation, their application and statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

The students will learn:

- The idea of partial differential equation and its different types of solution.
- The concept of method of separation of variables and Fourier transform to solve partial differential equations.
- The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
- The idea of probability, random variables, discrete and continuous probability distributions and their properties.
- The statistical methods of studying data samples, hypothesis testing and statistical quality control.

#### Course Articulation Matrix of Mathematics-IV.

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BAS-303.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BAS-303.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BAS-303.4 | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

#### *Module I: Partial Differential Equations*

8

Origin of Partial Differential Equations, Linear and Non-Linear Partial Differential Equations of first order, Lagrange's Equations method to solve Linear Partial Differential Equations, harpit's method to solve Non-Linear Partial Differential Equations, Solution of Linear Partial differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

#### *Module II: Applications of Partial Differential Equations and Fourier Transform*

8

Method of separation of variables, Solution of one dimensional heat equation, wave equation, Two dimensional heat equation (only Laplace Equation) and their application, Complex Fourier transform, Fourier sine transform, Fourier cosine transform, Inverse transform, convolution theorem, Application of Fourier Transform to solve partial differential equation.

**Module III: Statistical Techniques I**

8

Overview of Measures of central tendency, Moments, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves, Correlation and Rank correlation, Regression Analysis: Regression lines of  $y$  on  $x$  and  $x$  on  $y$ .

**Module IV: Statistical Techniques II**

8

Overview of Probability Random variables (Discrete and Continuous Random variable) Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poisson and Normal distributions.

**Module V: Statistical Techniques III**

8

Introduction of Sampling Theory, Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, t-test, Z-test and Chi-square test, Statistical Quality Control (SQC), Control Charts, Control Charts for variables (X and R Charts), Control Charts for Variables (p, np and C charts).

**Text Book:**

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 44<sup>th</sup> Edition, Khanna Publishers, New Delhi.

**Reference Book:**

1. Peter V. O'Neil, "Advance Engineering Mathematics", SI Edition 8<sup>th</sup> Edition, Cengage Learning, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publishing Company Ltd., 2017.
3. S. S. Sastry, "Introductory methods of Numerical solutions", 4th Edition, Prentice Hall of India.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley Publications, 1999.
5. R.K. Jain & S.R.K. Iyengar, "Numerical Methods", New Age International (P) Limited
6. James F. Epperson Mathematical Reviews "An Introduction To Numerical Methods and Analysis" Second Edition, Wiley;  
<https://perhuman.files.wordpress.com/2014/07/metodos-numericos.pdf>

**Reference Books**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.
2. T. Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi.
3. R.K. Jain and S.R.K. Iyengar: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
4. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
5. D.N. Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; Kitab Mahal Distributors, New Delhi.

## 2. BVE301 : Universal Human Values & Professional Ethics (2 1 0) 3 Credits

### Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content, and process of value education.
2. To help students initiate a process of dialog within themselves to know what they really want to be in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

### Course Outcome:

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.
3. Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

### Catalogue Description:

Every human being has two sets of questions to answer for his life: a) what to do? And, b) how to do? The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self- exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfilment in the nature and the co- existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and professional ahead.

| CO           | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 0 | PO1 1 | PO1 2 |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| BVE301/401.1 | 2    | 3    | 3    | 3    | 2    |      |      |      |      |      |       | 3     |
| BVE301/401.2 | 3    | 2    | 2    | 2    | 1    |      |      |      |      |      |       | 2     |

|                  |   |   |   |   |   |  |  |  |  |  |  |   |
|------------------|---|---|---|---|---|--|--|--|--|--|--|---|
| BVE301/401.<br>3 | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 1 |
| BVE301/401.<br>4 | 3 | 3 | 2 | 1 | 2 |  |  |  |  |  |  | 3 |
| BVE301/401.<br>5 | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  | 3 |
| Avg.             | 3 | 3 | 2 | 2 | 2 |  |  |  |  |  |  | 2 |

### Unit 1:

**Course Introduction-** Need, Basic Guidelines, Content, and Process for Value Education  
Understanding the need, basic guidelines, content, and process for Value Education, Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation – as the mechanism for self-exploration, Continuous Happiness, and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship, and Physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels..

### Unit2: Understanding Harmony in the Human Being – Harmony in Myself

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ – Sukh and Savidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, program to ensure Sanyam and Swasthya.

### Unit 3: Understanding Harmony in the Family and Society- Harmony in human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*Sarvabhaum Vyawastha*)- from family to world family!.

### Unit 4: Understanding Harmony in the Nature and Existence – Whole existence as Co-existence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

### Unit 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

**Text Books:**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course 8lats8n Values and Professional Ethics.

**Reference Books:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

**Mode of Evaluation:** Assignment / Project / Seminar / Continuous Assessment Test / Semester End Exam

**3. BTT301: YARN MANUFACTURE-I (L T P 3 1 0) Credit 4**

| Sr. No. | Course Code    | Course                    | Semester | Year                         |
|---------|----------------|---------------------------|----------|------------------------------|
| 03      | <b>BTT-301</b> | <b>Yarn Manufacture-I</b> | III      | 2 <sup>nd</sup> . Y. B. Tech |

|     |   |
|-----|---|
| CO1 | Explain the importance of ginning & select ginning machine for different types of cotton. |
|-----|---|



|     |   |
|-----|---|
| CO2 | Explain the principles involved in opening & cleaning machines in blow room.        |
| CO3 | Explain principles involved in carding  |
| CO4 | Explain autollevelling concept of card & Calculate production & efficiency of card. |
| CO5 | Explain the principle of drafting & doubling & role of draw frame & its calculation |

**Course Articulation Matrix of Yarn Manufacture-I:**

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BTT-301.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BTT-301.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BTT-301.4 | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**UNIT I:** - Introduction of ginning process, Functions of ginning machines, Types of Ginning machines, Objects of mixing, different types of mixing & blending, Difference between mixing & blending, : Objects of Blow room for natural and synthetic fibres, Principles of opening and cleaning, Principles of various opening and cleaning machines of blow room line, Various components & zones of blow room machines, Conventional blow room machines. Lap forming mechanism,

**UNIT II:** Automation and concept of modern blow room line, Latest developments in Blow room machines, Automatic bale opener, Mild openers– Maxi-flow/ Uni-clean/Vario-clean, modern Blenders, Intensive openers, cleanomat, flexi-clean, Waste extracted at various openers and beaters, Cleaning efficiency of different machines, nep generation,

**UNIT III:** Principle and concept of chute feed to card. Advantages and limitations, study of design details of different types of chute feeding systems, Objects of carding, detailed description of various parts of carding machine, **Carding theory**–Opening of fibre mass–Carding actions, –Web formation and fibre configuration, blending action, .

**UNIT IV:**, Card clothing, , carding defects, Roller cards, Tandem carding, Auto-leveller used in carding, Modern development in carding. Calculations related to blow room & card.

**Unit V:** Functions of draw-frame, principles of drafting and doubling, Study of constructional details and design of drafting systems, weighting in draw frame, draft distribution, drafting force, details of drafting system, Coiling system and stop motion, blending at draw-frame, maintenance of draw frame, such as rollers, roller weightings, drafting systems etc, Auto leveling at draw-frame. On- line quality monitoring and control, Developments in draw frame drafting, calculations relating draw frame,

**References:**

- W.Klein. The Textile Institute Publication – Manual of Textile

Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993

- P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
- E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
- C Shringley, ‘Opening and Cleaning’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
- I Doraiswamy. ‘Cotton Ginning’, Textile Progress, Textile Institute Publication. 1993
- R Chattopadhyay, Blow-room and Carding- Training Programme conducted by NCUTE, IIT, Delhi. 1999

#### 4. BTT302-FABRIC MANUFACTURE-I ( L T P 3 1 0) Credit 4

**Course Outcome:** After completing the course student will be able to:

|     |  |
|-----|--|
| CO1 | Explain and explain the objectives of winding, warping & Sizing                                |
| CO2 | Be able to explain the principles of winding, sectional warping, beam warping                  |
| CO3 | Able to calculate the production of winding, warping & sizing machines & material balance      |
| CO4 | Able to explain the concepts of stop motions, cutters, control systems in different machine    |
| CO5 | Decide the size recipe for different types of fibres and yarn, developments in sizing machines |

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 2   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |
| 2    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 3   | 2   |     |     |     |     |      |      | 2    |
| 4    | 3   | 3   | 2   | 2   | 3   |     |     |     |     |      |      | 1    |
| 5    | 2   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |
| Avg. | 3   | 2   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**UNIT I:** Objects of winding process, classification of winding, (manual & automatic), various latest winding machines with detailed construction and working, Description of various winding accessories.

**UNIT II:** Drum and spindle driven winding= mechanism, motions of wound and supply packages, package building mechanism, digi-cone winder, winding package faults & their prevention, Geometrical aspects: - Cone angle, coil angle, wind ratio, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, calculations: winding speed, production/spindle & per machine, and efficiency.

**UNIT III:** Objectives of pirn winding, its advantage over rewound weft, Pirn build: - length of wind, chase length, diameter, bunch, tail ends etc. their importance during weaving process. Yarn tensioning- types and their mechanism. Winding and unwinding tension variation, Yarn clearing-principle and measurement. Yarn imperfections, faults and splicing. Classimat representation

**UNIT IV:** Objectives of warping, precautions to be considered in the process,

classification of warping process- (beam warping, sectional warping, ball warping), Latest Warping machine: - construction and working, Creel: - framing (requirements, length, height, pitch, etc.) pegs, tensioning arrangements guides, blow fan, types of creels(parallel, V, V-nose etc.), Waxing attachment, computerized warping machines. Warping efficiency with different creels.

**UNIT V:** Objectives of sizing and sizing terminology, achieving the objectives through sizing paste constituents, concepts of sizing process: pre-wetting, sizing, splitting and drying, hank sizing, ball warp sizing, cold sizing , hot-melt sizing, Slasher sizing, multi- cylinder sizing, description of sizing ingredients and factors affecting sizing efficiency, Latest developments in sizing process by various sizing machine manufacturers.

**References:**

- M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
- R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
- M K Talukdar, P K Sriramalu, D B Ajgaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
- K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
- R Sengupta. **Yarn Preparation-Vol.-I and Vol-II**. University of Mishigan, Popular Prakashan, 1963
- J.E. Booth Textile Mathematics-Vol. I, II &III Published by The Textile Institute Manchester, 1975
- B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc.,US; 6th edition (1 March 1983)
- P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

**5 BTT303: TEXTILE FIBRE-I (L T P 2 1 0) Credit 3**

**Course Outcome:** After completing the course student will be able to:

|     |  |
|-----|--|
| CO1 | Generate a general idea about Natural fibres and their classification. Define and explain textile fibre properties in general, able to give fundamentals of major characterization techniques of textile fibres and polymers, explain fibre yarn and fabric property relationships, explain essential and desirable properties   |
| CO2 | Describe their origin of and agricultural methods of production of fibres,compare properties of these fibres. Explain Polymer systems, morphological and analysefine structure, explain basics XRD results, electron microscopes, describe chemical components and relevant reactions, importance in processing, explain application in relation to properties of fibres.. |
| CO3 | Classify natural protein fibres (wool and Silk) in detail by various means, by geographical origin and genetic, explain Growth of wool and basic sericulture. Describe morphological structure, polymer system of wool and silk, & their characterization.   |

|     |   |
|-----|---|
| CO4 | State, understand and explain general properties of Wool fibres (Physical and chemical), relate fibre properties with application. Compare Wool and silk and other fibres in terms of application and properties. |
| CO5 | State and explain general properties of Silk fibres (Physical and chemical), correlate them with application. Describe modification of wool and silk fibres.  |

### Course Articulation Matrix of Textile Fibre-I:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 4    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 5    | 3   | 3   | 2   | 3   | 2   | 2   | 2   |     |     |      |      |      |
| Avg. | 3   | 3   | 3   | 3   | 3   | 2   | 2   |     |     |      |      | 1    |

**UNIT I:** Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man-made fibres. General Testing Methods and Characterization techniques, general properties of fibres. Moisture relations in textiles.

**UNIT II:** Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

**UNIT III:** Flax/Jute/Ramie cultivation, retting and extraction process, grading, Fibre structure of jute and flax, chemical compositions, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like hemp, banana, bamboo fibre etc.

**UNIT IV:** Types of wool and its grading, Classification and Origin, Morphological structure (bilateral, scaly structure, ortho and paracortex), chemical (protein) composition, effect on properties, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc.

**UNIT V:** Types of silk and its production, chemical composition, polymer systems, molecular and morphological structure of silk, physical & chemical properties of silk and its applications.

### References:

- Shakyawar DB and Singh MK., Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
- J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
- R W Moncrieff., Man Made Fibre, 5<sup>th</sup> Edition, Publisher Unknown, 1970-
- R H Peters Textile Chemistry Vol I The Chemistry of Fibres . Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)

- A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
- V A Sehnai. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
- Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

**6. BTT351: YARN MANUFACTURE-I LAB (0 0 2) Credit 1**

1. To determine trash content% and analysis of waste by using trash analyzer
2. To study and sketch general outline of opener, cleaner and mix/ blender in blow room
3. To study feed regulating mechanism in blow room
4. To study different setting point on blow room
5. To determine cleaning efficiency of blow line
6. To study and sketch the working mechanism of various operations of a card
7. To study different settings of the card
8. To study gearing plan and calculate draft constant and production constant of card
9. To study nep removal efficiency of card
10. To study various types of waste in card and its analysis

**7. BTT352: FABRIC MANUFACTURE-I LAB ( 0 0 2) credit 1**

1. Study of weaving preparatory and weaving processes
2. Study of loom drive, loom timing, passage of material and primary motions.
3. Study of precision winding machine
4. Study of drum winding machine.
5. Study of cheese winding machine.
6. Study of various types of yarn tensioners used in winding
7. Study of autoconer and its functions
8. Study of pirn winding machine
9. Study of sectional warping machine
10. Study of beam warping machine

**8. BTT353: TEXTILE FIBRE-I Lab (0 0 2) Credit 1**

Principle of microscopy, microscopic identification of natural fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

- Identification of Natural Fibres, namely Cotton, Wool, Silk, Jute
- Determination of fineness of fibres
- Blend Analysis by chemical means

## 9. BCC301 Cyber Security (2 0 0) Credit 2

| Course Outcome ( CO )  |   | Bloom's Knowledge Level (KL)    |
|--|---|---------------------------------|
| CO1  | Understand the basic concepts of cyber security and cybercrimes.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2  | Understand the security policies and cyber laws.  | K <sub>1</sub> , K <sub>2</sub> |
| CO3  | Understand the tools and methods used in cyber crime  | K <sub>2</sub>                  |
| CO4  | Understand the concepts of cyber forensics  | K <sub>1</sub> , K <sub>2</sub> |
| CO5  | Understand the cyber security policies and cyber laws   | K <sub>2</sub>                  |
| Detailed Syllabus  |   |                                 |
| Unit   | Topic   | Lecture                         |
| 1  | <b>INTRODUCTION TO CYBER CRIME</b> : Cybercrime- Definition and Origins of the word Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.<br>Cyber offenses: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.  | 04                              |
| 2  | <b>CYBER CRIME</b> : Mobile and Wireless Devices-Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era. | 04                              |
| 3  | <b>TOOLS AND METHODS USED IN CYBERCRIME</b> : Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan-horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction to Phishing, Identity Theft (ID Theft).   | 04                              |
| 4  | <b>UNDERSTANDING COMPUTER FORENSICS</b> : Introduction, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation.<br>Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics   | 04                              |
| 5  | <b>INTRODUCTION TO SECURITY POLICIES AND CYBER LAWS</b> :<br>Need for An Information Security Policy, Introduction to Indian Cyber Law, Objective and Scope of the Digital Personal Data Protection Act 2023, Intellectual Property Issues, Overview of Intellectual Property Related Legislation in India, Patent, Copyright, Trademarks   | 04                              |
| <b>Text books:</b>   |   |                                 |
| 1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, |   |                                 |

Computer Forensics and Legal Perspectives”, Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, Publish Date 2013.

2. Basta, Basta, Brown, Kumar, Cyber Security and Cyber Laws, 1st Edition, Cengage Learning publication
3. Dr. Surya PrakashTripathi, RitendraGoyal, Praveen Kumar Shukla, KLSI. “Introduction to information security and cyberlaws”. Dreamtech Press. ISBN: 9789351194736, 2015.
4. Cyber Security and Data Privacy by Krishan Kumar Goyal , Amit Garg , Saurabh Singhal , HP HAMILTON LIMITED Publication,ISBN-13-978-1913936020
5. Thomas J. Mowbray, “Cybersecurity: Managing Systems, Conducting Testing
6. Investigating Intrusions”, Copyright © 2014 by John Wiley & Sons, Inc, ISBN: 978 - 1-118 -84965 - 1.
7. James Graham, Ryan Olson, Rick Howard, “Cyber Security Essentials”, CRC Press, 15-Dec 2010. Anti- Hacker Tool Kit (Indian Edition) by Mike Shema, McGraw-Hill Publication.

## **10 BCC351 : Internship Assessment / Mini Project\* Credit 2**

## 4<sup>th</sup> Semester B. Tech. Textile Technology

### 1. BOE411: Polymer Science & Technology (SBOE): (L T P 3 1 0) Credit 4

#### *Course Aim*

The aim of this course is to provide students with a comprehensive view of polymer science and technology, including the chemical structure of various polymers, methods of measuring the molecular weight, polymerization kinetics, and polymer processing technologies. The focus is mainly on processing of polymers as well as on the behaviour and technical applications of different polymeric materials.

#### *Course Objectives:*

To provide fundamental and applied knowledge of polymers and their synthesis, manufacturing, processing, characterization and applications of polymers in space, oceans, electronics, agriculture, automobile, sports and building constructions.

**Course Outcomes:** Upon completion of this course, the students will be able to:

| Units CO | Course Outcome  | Bloom's Level |
|----------|---|---------------|
| CO1      | Understand the concept of polymer synthesis, Functionality, Crystallinity, Calculation of average molecular weight, reaction kinetics, physical properties and factors affecting the strength of polymers | K4            |
| CO2      | Understand the properties of polymers, types and mechanism of polymerization  | K3            |
| CO3      | Understand and apply the various processing and manufacturing techniques, high performance polymer  | K3            |
| Co4      | Understand the preparation, properties and technical applications of polymers   | K3            |
| CO5      | Understand the applications of different polymeric materials in current scenario of development   | K3            |

| Unit | Topics  | Lectures/ Hours |
|------|---|-----------------|
| 1    | Introduction, Chemistry of Polymer Synthesis, Classification, Functionality, Tacticity, Crystallinity in Polymers and its Effect on Properties of Polymers, Concepts of Average Molecular Weight in Polymers, Polymer Reaction Kinetics, Physical Properties, Factors Affecting Strength. | 8               |
| 2    | Effect of Structure on Properties of Polymers, Organic Polymers, Step Growth and Chain Growth Polymerization and its Mechanism, Coordination, Polymerization, Copolymerization  | 8               |
| 3    | Polymer Processing, Injection, Moulding, Blow Moulding, Compression Moulding, Introduction to High Performance Polymers and Polymer Composites.   | 8               |
| 4    | , Properties and Technical Applications of Thermoplastic (PVC, PVA, PTEE), Thermostats (PF, UF, MF) and Elastomers (SBR, Nitril Rubber, Butyl Rubber, Polychloroprene), Vulcanization of Rubber and its advantages, Biopolymers and Degradation of Polymers                               | 8               |
| 5    | Epoxy Resins, Silicones, Application of Polymer in Space, Ocean, Electronics Medical, Agriculture, Automobile, Sports and Building Construction   | 8               |



**Text Books:**

1. Polymer Science, Wiley & Sons, 3<sup>rd</sup> Edition, By Billmeyer, F.W. Jr. ISBN: 978-8126511105 (2007).
2. Fundamentals of Polymers, McGraw Hill By Kumar, A., Gupta, R. K. ISBN: 0-8247-0867-9 (2003).
3. Polymer Science and Technology, 3<sup>rd</sup> Edition, Prentice Hall By Joel R Fried, ISBN: 978-0- 13-703955-5, (2014).
4. Polymer Science and Technology, 1<sup>st</sup> Edition, CRC Press Inc By Robert O Ebewe, ISBN: 978-0849389399 (2000).
5. Polymer Science and Technology, 3<sup>rd</sup> Edition, McGraw Hill Education (India) Private Limited, By Ghosh Premamoy, ISBN: 978-0070707047 (2011).

**Reference Books:**

1. Principles of Polymer Processing, 2<sup>nd</sup> Edition, Wiley Interscience, Tadmo, Z; Gogos, C.G., ISBN: 0-471-38770-3 (2006).
  2. Polymer Science and Engineering, Prentice Hall of India, Williams, D. J., ISBN: 978-0136856368 (1971).
- Handbook of Polymer Science and Technology, 1<sup>st</sup> Volume, 1<sup>st</sup> Edition, CBS Publication by Ferry MH, ISBN: 978- 8123911328 (2012)

**2. BAS 401: Technical Communication (L T P 2 1 0) Credit 3****Course Objectives**

1. Explain the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Enhance confidence in face of diverse audience.
4. Create a vast know-how of the application of the learning to promote their technical competence.
5. Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 2    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 3    |     |     |     |     |     |     |     |     |     | 3    |      | 1    |
| 4    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 5    |     |     |     |     |     |     |     |     |     | 2    |      | 2    |
| Avg. |     |     |     |     |     |     |     |     |     | 3    |      |      |

**Unit 1 : Fundamentals of Communication and Voice Dynamics:**

Role and Purpose of Communication, Types & Flow of Communication, Barriers to Effective Communication,  
7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds, Tone: Rising and Falling Tone.

**Unit 2 : Communication Skills for Career Building**

CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.

### **Unit 3: Communication Skills for Presentation: Writing, Designing, and Speaking**

Thesis and Project Report Writing, Technical Proposal Writing, how to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.

### **Unit 4 : Communication and Leadership Development**

Leadership Communication, Communication and Social competence: context, feelings, intentions, behaviours, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.

### **Unit 5 : Digital Communication and Personality Making**

Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of Personality; Concept of Personality: Maslow, Freud, Vivekananda, Jung Typology & Personality Assessment.

#### **Prescribed Books:**

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2018, New Delhi
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Technical Communication, by Pfeiffer, 6<sup>th</sup> edn (Pearson)
4. Soft Skills & Employability, Sabina Pillai and Agna Fernandez Cambridge University Press 2018.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S.Publications India Ltd.; Krishan Nagar, 2014, Delhi.

#### **Web link/ free resources for reference:**

- <https://online.hbs.edu/blog/post/leadership-communication>
- <https://blog.hubspot.com/marketing/content-creation>
- <https://vincenttriola.com/blogs/ten-years-of-academic-writing/sigmund-freud-carl-jung-carl-rogers-abraham-maslow>
- <https://www.verywellmind.com/jungs-theory-of-personality-learning-styles-2795160>
- <https://www.humanmetrics.com/personality>
- <https://hbr.org/2022/11/how-great-leaders-communicate>

### **3 BTT401: YARN MANUFACTURE-II (L T P 3 1 0) Credits 4**

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Identify the importance of preparatory process for combing, the parameters in preparatory process for combing & its influence on combing  |
| CO2 | Elaborate the concept & mechanism involved in combing & demonstrate different comber setting for different types of combing   |
| CO3 | Explain the role of roving process, concept of twisting & winding, building mechanism & able to calculate draft, twist, production & other parameters related to D/F, comber & roving frame |
| CO4 | Explain the principle of ring spinning & building of cop  |
| CO5 | Explain the role of different parts, developments in ring spinning  |

#### **Course Articulation Matrix of Yarn Manufacture-II:**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|

|      |   |   |   |   |   |  |  |  |  |  |  |   |
|------|---|---|---|---|---|--|--|--|--|--|--|---|
| 1    | 2 | 3 | 3 | 3 | 1 |  |  |  |  |  |  | 3 |
| 2    | 3 | 3 | 3 | 2 | 2 |  |  |  |  |  |  | 2 |
| 3    | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 3 |
| 4    | 3 | 3 | 3 | 1 | 2 |  |  |  |  |  |  | 2 |
| 5    | 3 | 2 | 3 | 3 | 3 |  |  |  |  |  |  | 2 |
| Avg. | 3 | 3 | 3 | 2 | 2 |  |  |  |  |  |  | 2 |

**UNIT I:** Objects of combing process, Requirements of good lap – importance of number of passages, importance of good lap, linear density of lap, etc., Methods of comber lap preparation – Different sequences of comber lap preparation, study of sliver lap machine, ribbon lap machine, unilap machine, Developments in lap preparation machines.

**UNIT II:** Constructional details of different Comber (for cotton and worsted)- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber, Study of combing cycle, Forward and backward combing, Comber Settings, Norms for production, speed, Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality, Developments in combing.

**UNIT III:** Objects of speed frame, Concepts of drafting, twisting and winding process. Constructional aspects of Speed-frame – Creel, top arm apron drafting system, Spindle & flyer assembly, stop motions. differential motion in speed frame, building mechanism, Developments in speed frame, Calculation related to speed frame.

**Unit IV:** Objectives & principles of ring spinning machines, constructional features & identification of different parts, principle of drafting systems & weighting system in ring frame, twisting winding & building operation, forces acting between ring & traveler, limiting speed of traveler, yarn tension in ring spinning, classification, form of traveler, traveler mass & material,

**Unit V:** Different types of ring, different ring traveler combination, fibre lubrication, running-in of new ring, winding process, cop structure, spinning geometry, causes of end breakage, recent development in ring spinning, calculation related to speed, draft, twist, production & efficiency in ring spinning

**References:**

1. W.Klein. The Textile Institute Publication – Manual of Textile Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993
2. P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
3. E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
4. C Shringley, Draw frame, Speed frame’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
5. R Chattopadhyay, Draw frame, Speed frame - Training Programme conducted by NCUTE, IIT, Delhi. 1999

#### 4 BTT402: FABRIC MANUFACTURE-II (L T P 3 1 0) Credits 4

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Explain objectives of drawing-in, limitations of knotting   |
| CO2 | Explain & able to explain primary & secondary motions involved in loom, different methods of shedding & picking, different types of let-off & take-up mechanism |
| CO3 | Explain & explain tappet, Dobby & jacquard looms & their uses & mechanism involved in it.   |
| CO4 | Explain mechanism involved in terry, working of drop box loom, pick at will loom, various stop motions involved in loom   |

**Course Articulation Matrix of Fabric Manufacture-II:**

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   |     |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 2   | 1   |     |     |     |     |     |      |      | 2    |
| 5    | 2   | 3   | 3   | 2   | 1   |     |     |     |     |      |      | 1    |
| Avg. | 3   | 3   | 3   | 1   | 1   |     |     |     |     |      |      | 1    |

**UNIT I:** Drawing-in: Objectives, process description, reed count system, manual drawing-in, semi-automatic drawing-in process, Knotting process and its limitations. Various methods of fabric manufacture and automatic weaving: - Weaving, knitting, braiding, non-woven, brief description of all methods and processes involved in it,

**UNIT II:** Different kinds of fabrics: Grey, mono-colour, multi-colour, warp or weft stripes, checks etc., General description of plain power looms, introduction to weaving process, primary, secondary and auxiliary motion of plain power looms, Various ways of shedding, over and under pick motion, tappet shedding,

**UNIT III:** Temples and its utility, idea about healds count and reed count in different system, Negative and positive take up motion, five wheel and seven wheel take up motion and positive let-off motions, Calculations: -Production and efficiency of machine.

Unit IV: Scope & limitation of doobby, negative and positive doobby, cross border doobby, Development in doobby, Scope and limitations doobby, brief description of Crompton and Knowles doobby, cross border doobby, method of pegging for doobby, methods of pegging, heald reversing motion. Warp protective devices, side and centre weft fork motion.

**UNIT V:** Jacquards shedding, types of jacquards and their principle of working, size and figuring capacity of jacquard, cross border jacquards. Single lift single cylinder Jacquard, Double lift single cylinder, Double lift double cylinder, split harness, Different system of harness tie-up, terry mechanism, Recent developments in jacquard weaving.

**References:**

1. M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
2. R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
3. M K Talukdar, P K Sriramalu, D B Ajgaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
4. K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
5. R Sengupta. **Yarn Preparation-Vol.-I and Vol.-II**. University of Mishigan, Popular Prakashan, 1963
6. J.E. Booth Textile Mathematics-Vol. I, II & III Published by The Textile Institute Manchester, 1975

7. B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc., US; 6th edition (1 March 1983)
8. P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

### 5. BTT403: TEXTILE FIBRE-II (L T P 2 1 0) Credits 3

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Generate a general idea about synthetic fibres and their classification. Learning about general principles of fibre manufacturing. Conceptualize properties of fibre forming polymers, polymerization fundamentals, structure property relationships and changes during processing. |
| CO2 | Learn and understand about raw material requirements, polymerization and spinning technologies of different important synthetic fibres, e.g. Nylons, PET, PE, PP, Rayon, Acrylic.   |
| CO3 | Know about physical, chemical and other functional properties of the commercial fibres and carry out fundamental calculations related to synthetic fibre production.  |
| CO4 | Analyze factors affecting different physical and chemical properties of the fibres.   |
| CO5 | Develop idea of fibres for diversified applications for specific end use and requirements. Correlate fibre properties with end uses.  |

#### Course Articulation Matrix of Textile Fibre-II:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 1   | 2   |     |     |     | 2   |     |     |      |      |      |
| 2    | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |
| 3    | 2   | 3   | 1   | 3   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 3   |     |     |     |     |     |     |      |      |      |
| 5    | 3   | 1   | 1   |     |     |     | 2   |     |     |      |      | 1    |
| Avg. | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |

**UNIT I:** Classification of man-made fibres, definition of regenerated and synthetic fibres, Concepts of molecular weight, methods of determination of MW, Degree of polymerization, Orientation and Crystallinity, Characteristics of fibre forming polymer. Study of some Characterization methods such as birefringence and DSC methods for property evaluation of produced fibres and polymeric materials. Introduction to methods of fibre formation by melt spinning, dry spinning, & wet spinning, important process parameters of spinning systems.

**UNIT II:** Polyethylene terephthalate fibre (PET) – History of development, Fundamentals of Step growth polymerization, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, physical & chemical properties of polyester fibres, applications.

**UNIT III:** Polyamide Fibres – History of development, Different types of polyamide fibres, Nylon polymer production by continuous polymerization in VK Tube, Manufacturing of Nylon 6 fibre by melt spinning, Properties of nylon 6 fibre, Polymer production of Nylon 66, Nylon 66- fibre formation by melt spinning, Physical & chemical properties and applications.

**UNIT IV:** Basic of Free radical polymerization, Polyacrylonitrile fibres, Polyurethane fibres brief manufacturing process by wet and dry spinning, physical and chemical properties of

acrylic fibres & its applications, Properties of polyethylene fibre, Type of polypropylene (PP), Properties of polypropylene fibre. Introduction of high performance fibres.

**UNIT V:** Introduction to solution spinning and regenerated fibre, Raw material for viscose rayon, Manufacturing sequence of viscose fibre, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibres and Lyocell fibres.

**References:**

1. Shakyawar DB and Singh MK,. Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
2. J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
3. R W Moncrieff., Man Made Fibre,5<sup>th</sup> Edition, Publisher Unknown, 1970-
4. R H Peters Textile Chemistry Vol I The Chemistry of Fibres. Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)
5. A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
6. V A Sehnaï. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
7. Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

**6. BTT451: YARN MANUFACTURE-II LAB (L T P 0 0 2) Credit 1**

1. Study and sketch the working mechanism of draw frame
2. To study of constructional details of draw-frame,
3. To study the roller setting of draw frame drafting system
4. Driving arrangement and calculation of speeds, draft and production of D/F.
5. Processing of Material on Draw frame and evaluating performance.
6. Study of constructional details & Driving arrangement and calculation of speed frame.
7. Study of drafting system of speed frame
8. Study of sliver lap machine and calculation of speeds of different parts and production calculations of sliver lap.
9. Study of sliver lap machine and calculation of speeds of different parts and production calculations of Ribbon lap.
10. Study of sliver lap machine and calculation of speeds of different parts and production calculations of comber.

**7. BTT452: FABRIC MANUFACTURE-II LAB (L T P 0 0 2) Credit 1**

1. General study of shedding mechanism.
2. Study of over pick mechanism
3. Study under pick mechanism
4. Study of 5 wheel & seven wheel take up motion
5. Study of negative let of motion
6. Study of Cam doobby and paper card cutting.
7. Study & working of weft feeler motion.

8. Study & working of auto let-off motion.
9. Study of various dobby mechanics.
10. Study of various jacquard looms.
11. General study of mechanical Jacquard & method of card cutting

#### 8. BTT453: TEXTILE FIBRE-II LAB (L T P 0 0 2) Credit 1

- Principle of microscopy, microscopic identification of man-made fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.
- Identification of Synthetic Fibres, namely Polyester, Nylon, Polypropylene, Acrylic fibres (microscopic views, burning tests and chemical dissolution methods)
- Determination of fineness of fibres by cutting and weighing methods
- Blend Analysis by Chemical means

#### 9: BCC402 Python Programming (L T P 2 0 0) Credit 2

| Course Outcome ( CO) |  | Bloom's Knowledge Level (KL)    |
|----------------------|--|---------------------------------|
| CO1                  | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2                  | Express proficiency in the handling of strings and functions   | K <sub>1</sub> , K <sub>2</sub> |
| CO3                  | Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.   | K <sub>3</sub>                  |
| CO4                  | Identify the commonly used operations involving file systems and regular expressions.  | K <sub>1</sub> , K <sub>2</sub> |
| CO5                  | Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python  | K <sub>2</sub> , K <sub>3</sub> |
| Detailed Syllabus    |  |                                 |
| Unit                 | Topic  | Lecture                         |
| I                    | <b>Introduction to Python:</b> Python variables, Python basic Operators, Understanding python blocks. Python Data Types, Declaring and using Numeric data types: int, float etc.   | 03                              |
| II                   | <b>Python Program Flow Control Conditional blocks:</b> if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks.   | 05                              |
| III                  | <b>Python Complex data types:</b> Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python Functions, Organizing python codes using functions. | 04                              |

|   |  |           |
|---|--|-----------|
| IV  | <b>Python File Operations:</b> Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations. | <b>04</b> |
| V   | <b>Python packages:</b> Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tkinter introduction, Tkinter and Python Programming, Tk Widgets, Tkinter examples. Python programming with IDE.                      | <b>04</b> |
| <b>Text books:</b> <ol style="list-style-type: none"> <li>1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education, 2016</li> <li>2. Lambert, Fundamentals of Python: First Programs with MindTap, 2nd 1st Edition, Cengage Learning publication</li> <li>3. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley, 2015</li> <li>4. Jeeva Jose &amp; P.Sojan Lal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Publishers, New Delhi,2016</li> <li>5. Downey, A. et al., “How to think like a Computer Scientist: Learning with Python”, John Wiley, 2015</li> <li>6. Mark Lutz, “Learning Python”, 5th edition, Orelly Publication, 2013, ISBN 978- 1449355739</li> <li>7. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology CengageLearning Publications, 2013, ISBN 978- 1590282410</li> <li>8. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage LearningPublications, 2013, ISBN 978-1435455009</li> <li>9. David Beazley, Brian Jones., “Python Cookbook”, Third Edition, Orelly Publication, 2013, ISBN 978-1449340377</li> </ol> |  |           |

**10. BVE451: Sports and Yoga-II: (0 0 3) Non Credit**



# **SYLLABUS**

**Uttar Pradesh Textile Technology Institute, Kanpur**

**Affiliated to**

**DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**



**PROPOSED STUDY & EVALUATION SCHEME  
FOR  
2<sup>ND</sup> B. TECH. TEXTILE CHEMISTRY**

**On**

**AICTE B. Tech Model Curriculum Structure &  
Syllabus**

**(Effective from the Session: 2023-24)**

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup>Year B. Tech Textile Chemistry**  
**Uttar Pradesh Textile Technology Institute Kanpur**

Affiliated to

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year III-Semester**

**Effective from Session-2023-24**

| Sl. No. | Subject Codes   | Subject                                   | Periods   |          |          | Evaluation Scheme |            |            |            | End Semester |            | Total       | Credit    |
|---------|-----------------|---|-----------|----------|----------|-------------------|------------|------------|------------|--------------|------------|-------------|-----------|
|         |                 |   | L         | T        | P        | CT                | TA         | Total      | PS         | TE           | PE         |             |           |
| 1       | BOE311          | Polymer Science and Technology            | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 2       | BAS301          | Technical Communication                   | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 3       | BTT303          | Textile Fibre-I                           | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 4       | BTT304          | Principle of Yarn Manufacture             | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 5       | BTT305          | Preparatory to Processing of Textiles     | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 6       | BTT353          | Textile Fibre-I Lab                       | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 7       | BTT354          | Principle of Yarn Manufacture Lab         | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 8       | BTT355          | Preparatory to Processing of Textiles Lab | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 9       | BCC302          | Python Programming                        | 2         | 0        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 2         |
| 10      | BCC351          | Internship Assessment / Mini Project*     | 0         | 0        | 0        |                   | 100        | 100        |            |              |            | 100         | 2         |
| 11      | BVE351 / BVE352 | Sports and Yoga-II/ NSS-II                | 0         | 0        | 3        |                   |            |            | 100        |              |            | 100         | 0*        |
|         |                 | <b>Total</b>                              | <b>15</b> | <b>5</b> | <b>6</b> | <b>120</b>        | <b>160</b> | <b>280</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>1000</b> | <b>25</b> |

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup>Year B. Tech. Textile Chemistry**  
**Uttar Pradesh Textile Technology Institute, Kanpur**  
**Affiliated to**

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year IV-Semester**

**Effective from Session-2023-24**

| Sl. No. | Subject Codes   | Subject                                      | Periods   |          |          | Evaluation Scheme |           |            |            | End Semester |            | Total      | Credit    |
|---------|-----------------|--|-----------|----------|----------|-------------------|-----------|------------|------------|--------------|------------|------------|-----------|
|         |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
|         |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
| 1       | BAS403          | Math IV                                      | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 2       | BVE401          | Universal Human Values & Professional Ethics | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 3       | BTT403          | Textile Fibre-II                             | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 4       | BTT404          | Principle of Fabric Manufacture              | 3         | 0        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 5       | BTT405          | Technology of Dyeing-I                       | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 6       | BTT453          | Textile Fibre-II Lab                         | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 7       | BTT454          | Principle of Fabric Manufacture Lab          | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 8       | BTT455          | Technology of Dyeing-I Lab                   | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 9       | BCC401          | Cyber Security                               | 2         | 0        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 2         |
| 10      | BVE451 / BVE452 | Sports and Yoga-II/ NSS-II                   | 0         | 0        | 3        |                   |           |            | 100        |              |            | 100        | 0*        |
|         |                 | <b>Minor Degree/ Honors Degree MT1/ HT-1</b> |           |          |          |                   |           |            |            |              |            |            |           |
|         |                 | <b>Total</b>                                 | <b>15</b> | <b>5</b> | <b>9</b> | <b>120</b>        | <b>60</b> | <b>180</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>900</b> | <b>23</b> |

\*The Mini Project or internship (4 weeks) will be done during summer break after 4th Semester and will be assessed during V semester

## 3<sup>rd</sup> Semester B. Tech. Textile Chemistry

### 1. BOE311: Polymer Science & Technology (SBOE): (L T P 3 1 0) Credit 4

#### *Course Aim*

The aim of this course is to provide students with a comprehensive view of polymer science and technology, including the chemical structure of various polymers, methods of measuring the molecular weight, polymerization kinetics, and polymer processing technologies. The focus is mainly on processing of polymers as well as on the behavior and technical applications of different polymeric materials.

#### *Course Objectives:*

To provide fundamental and applied knowledge of polymers and their synthesis, manufacturing, processing, characterization and applications of polymers in space, oceans, electronics, agriculture, automobile, sports and building constructions.

**Course Outcomes:** Upon completion of this course, the students will be able to:

| Units CO | Course Outcome  | Bloom's Level |
|----------|---|---------------|
| CO1      | Understand the concept of polymer synthesis, Functionality, Crystallinity, Calculation of average molecular weight, reaction kinetics, physical properties and factors affecting the strength of polymers | K4            |
| CO2      | Understand the properties of polymers, types and mechanism of polymerization  | K3            |
| CO3      | Understand and apply the various processing and manufacturing techniques, high performance polymer  | K3            |
| Co4      | Understand the preparation, properties and technical applications of polymers   | K3            |
| CO5      | Understand the applications of different polymeric materials in current scenario of development   | K3            |

| Unit | Topics  | Lectures/ Hours |
|------|---|-----------------|
| 1    | Introduction, Chemistry of Polymer Synthesis, Classification, Functionality, Tacticity, Crystallinity in Polymers and its Effect on Properties of Polymers, Concepts of Average Molecular Weight in Polymers, Polymer Reaction Kinetics, Physical Properties, Factors Affecting Strength. | 8               |
| 2    | Effect of Structure on Properties of Polymers, Organic Polymers, Step Growth and Chain Growth Polymerization and its Mechanism, Coordination, Polymerization, Copolymerization  | 8               |
| 3    | Polymer Processing, Injection, Moulding, Blow Moulding, Compression Moulding, Introduction to High Performance Polymers and Polymer Composites.   | 8               |
| 4    | , Properties and Technical Applications of Thermoplastic (PVC, PVA, PTEE), Thermostats (PF, UF, MF) and Elastomers (SBR, Nitril Rubber, Butyl Rubber, Polychloroprene), Vulcanization of Rubber and its advantages, Biopolymers and Degradation of Polymers                               | 8               |
| 5    | Epoxy Resins, Silicones, Application of Polymer in Space, Ocean, Electronics Medical, Agriculture, Automobile, Sports and Building Construction   | 8               |

**Text Books:**

1. Polymer Science, Wiley & Sons, 3<sup>rd</sup> Edition, By Billmeyer, F.W. Jr. ISBN: 978-8126511105 (2007).
2. Fundamentals of Polymers, McGraw Hill By Kumar, A., Gupta, R. K. ISBN: 0-8247-0867-9 (2003).
3. Polymer Science and Technology, 3<sup>rd</sup> Edition, Prentice Hall By Joel R Fried, ISBN: 978-0-13-703955-5, (2014).
4. Polymer Science and Technology, 1<sup>st</sup> Edition, CRC Press Inc By Robert O Ebewe, ISBN: 978-0849389399 (2000).
5. Polymer Science and Technology, 3<sup>rd</sup> Edition, McGraw Hill Education (India) Private Limited, By Ghosh Premamoy, ISBN: 978-0070707047 (2011).

**Reference Books:**

1. Principles of Polymer Processing, 2<sup>nd</sup> Edition, Wiley Interscience, Tadmo, Z; Gogos, C.G., ISBN: 0-471-38770-3 (2006).
  2. Polymer Science and Engineering, Prentice Hall of India, Williams, D. J., ISBN: 978-0136856368 (1971).
- Handbook of Polymer Science and Technology, 1<sup>st</sup> Volume, 1<sup>st</sup> Edition, CBS Publication By Ferry MH, ISBN: 978-8123911328 (2012)

**2. BAS301: Technical Communication (L T P 2 1 0) Credit 3****Course Objectives**

1. Explain the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Enhance confidence in face of diverse audience.
4. Create a vast know-how of the application of the learning to promote their technical competence.
5. Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 2    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 3    |     |     |     |     |     |     |     |     |     | 3    |      | 1    |
| 4    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 5    |     |     |     |     |     |     |     |     |     | 2    |      | 2    |
| Avg. |     |     |     |     |     |     |     |     |     | 3    |      |      |

**Unit 1 : Fundamentals of Communication and Voice Dynamics:**

Role and Purpose of Communication, Types & Flow of Communication, Barriers to Effective Communication,  
 7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds,  
 Tone: Rising and Falling Tone.

**Unit 2 : Communication Skills for Career Building**

CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.

**Unit 3: Communication Skills for Presentation: Writing, Designing, and Speaking**

Thesis and Project Report Writing, Technical Proposal Writing, How to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.

## Unit 4 : Communication and Leadership Development

Leadership Communication, Communication and Social competence: context, feelings, intentions, behaviors, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.

## Unit 5 : Digital Communication and Personality Making

Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of Personality; Concept of Personality: Maslow, Freud, Vivekananda, Jung Typology & Personality Assessment.

### Prescribed Books:

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2018, New Delhi
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Technical Communication, by Pfeiffer, 6<sup>th</sup> edn (Pearson)
4. Soft Skills & Employability, Sabina Pillai and Agna Fernandez Cambridge University Press 2018.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S.Publications India Ltd.; Krishan Nagar, 2014, Delhi.

### Web link/ free resources for reference:

- <https://online.hbs.edu/blog/post/leadership-communication>
- <https://blog.hubspot.com/marketing/content-creation>
- <https://vincenttriola.com/blogs/ten-years-of-academic-writing/sigmund-freud-carl-jung-carl-rogers-abraham-maslow>
- <https://www.verywellmind.com/jungs-theory-of-personality-learning-styles-2795160>
- <https://www.humanmetrics.com/personality>
- <https://hbr.org/2022/11/how-great-leaders-communicate>

### 3. BTT303: TEXTILE FIBRE-I (L T P 2 1 0) Credit 3

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Generate a general idea about Natural fibres and their classification. Define and explain textile fibre properties in general, able to give fundamentals of major characterization techniques of textile fibres and polymers, explain fibre yarn and fabric property relationships, explain essential and desirable properties.   |
| CO2 | Describe their origin of and agricultural methods of production of fibres, compare properties of these fibres. Explain Polymer systems, morphological and analyse fine structure, explain basics XRD results, electron microscopes, describe chemical components and relevant reactions, importance in processing, explain application in relation to properties of fibres. |
| CO3 | Classify natural protein fibres (wool and Silk) in detail by various means, by geographical origin and genetic, explain Growth of wool and basic sericulture. Describe morphological structure, polymer system of wool and silk, & their characterization.  |

|     |   |
|-----|---|
| CO4 | State, understand and explain general properties of Wool fibres (Physical and chemical), relate fibre properties with application. Compare Wool and silk and other fibres in terms of application and properties. |
| CO5 | State and explain general properties of Silk fibres (Physical and chemical), correlate them with application. Describe modification of wool and silk fibres.  |

### Course Articulation Matrix of Textile Fibre-I:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 4    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 5    | 3   | 3   | 2   | 3   | 2   | 2   | 2   |     |     |      |      |      |
| Avg. | 3   | 3   | 3   | 3   | 3   | 2   | 2   |     |     |      |      | 1    |

**UNIT I:** Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man-made fibres. General Testing Methods and Characterization techniques, general properties of fibres. Moisture relations in textiles.

**UNIT II:** Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

**UNIT III:** Flax/Jute/Ramie cultivation, retting and extraction process, grading, Fibre structure of jute and flax, chemical compositions, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like hemp, banana, bamboo fibre etc.

**UNIT IV:** Types of wool and its grading, Classification and Origin, Morphological structure (bilateral, scaly structure, ortho and paracortex), chemical (protein) composition, effect on properties, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc.

**UNIT V:** Types of silk and its production, chemical composition, polymer systems, molecular and morphological structure of silk, physical & chemical properties of silk and its applications.

### References:

1. Shakyawar DB and Singh MK,. Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
2. J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadoh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
3. R W Moncrieff., Man Made Fibre,5<sup>th</sup> Edition, Publisher Unknown, 1970-
4. R H Peters Textile Chemistry Vol I The Chemistry of Fibres . Elsevier Publishing
5. Company; 1St Edition (January 1, 1963) (1 January 1963)
6. A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd

edition (4 January 2018)

7. V A Sehnaï. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
8. Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

#### **4. BTT304: PRINCIPLES OF YARN MANUFACTURE (L T P 3 1 0) Credit 4**

**UNIT I:** Cotton ginning, Name of ginning machines, different types of mixing. Different machines of blow room department with the basic idea of each machines along with their opening and cleaning principle. Lap formation and chute feed system.

**UNIT II:** Objectives of carding process. Description of carding machine parts with passage of materials, Carding and doffing actions. Flexible and metallic Card clothing. Carding, striping and grinding actions. Different carding engine setting and speed of different parts. Drafts (actual & mechanical) and draft constant, Quality of web and neps etc.

**UNIT III:** Objectives of Draw frame. Different types of drafting systems. Stop motion and their importance, weighting system used in draw frame, passage of material on modern draw frame machine, Concept of draft.

**UNIT IV:** Objectives of Comber, Passage of material of modern comber along with functions of various parts of comber machine, Fibre presentation and its effects on combing. Preparatory machines for comber and its working.

**UNIT V:** Objectives of speed frame, drafting, twisting & winding mechanism of speed frame. Package building on speed frame, ring frame, drafting twisting and winding on ring frame, doubleapron drafting system on ring frame.

#### **References:**

1. W.Klein. The Textile Institute Publication – Manual of Textile Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993
2. P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
3. E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
4. C Shringley, Opening and Cleaning’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
5. I Doraiswamy. ‘Cotton Ginning’, Textile Progress, Textile Institute Publication. 1993
6. R Chattopadhyay, Blow-room and Carding- Training Programme conducted by NCUTE, IIT, Delhi. 1999



## **5. BTT305- PREPARATORY TO PROCESSING OF TEXTILES (L T P 3 1 0) Credit 4**

### **UNIT I**

Natural and added impurities in grey fabric, Singeing-its object and various types of singeing. Introduction to various preparatory processes for cotton, wool, silk, nylon polyester, acrylic and their blends. Preparatory Process for wool: scouring, decatizing.

### **UNIT II**

Desizing- its objectives, various desizing methods with its advantages, disadvantages and comparative study (hydrolytic, oxidative methods), Scouring of cotton and other fibres: conventional and bio-scouring, Machinery for scouring and their working.

### **UNIT III**

Objectives of Bleaching, various types of bleaching agent such as NaOCl, CaOCl<sub>2</sub> and H<sub>2</sub>O<sub>2</sub>, NaClO<sub>2</sub>. Bleaching chemistry and mechanism of above mentioned bleaching agents, batch wise, semi continuous and continuous bleaching processes: J-box, Continuous bleaching range (CBR).

### **UNIT IV**

Methods used for determination of degradation of cotton during scouring and bleaching such as copper no., methylene blue absorption method, cuprammonium fluidity etc, optical whitening agent and their applications.

### **UNIT V**

Objectives of mercerization, physical and chemical changes in cotton due to mercerization. Methods and equipment for yarn and fabric mercerization. various methods of determination of efficiency of mercerization.

## **References:**

1. Technology of Bleaching Vol. 3 by VA Shenai
2. Textile Scouring & Bleaching by ER Trotman
3. Chemical Technology in the Pre-Treatment Processes of Textiles by S R Karmakar, Elsevier Publication
4. Bleaching & mercerization by JT Marsh
5. Bleaching & mercerization by BTRA

## **6. BTT353: TEXTILE FIBRE-I Lab (0 0 2) Credit 1**

Principle of microscopy, microscopic identification of natural fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

- Identification of Natural Fibres, namely Cotton, Wool, Silk, Jute
- Determination of fineness of fibres
- Blend Analysis by chemical means

## **7. BTT354: PRINCIPLES OF YARN MANUFACTURE LAB (0 0 2) Credit 1**

Practice in handling and operation of blow room, study of constructional details of machinery in blow room, card, draw frame, speed frame & ring frame, calculating speed of different machine

parts, Study of constructional details of card, change places and speed calculation of a carding machine, finding out individual draft and total draft in carding machine, draft frame, ring frame and roving frame

### 8. BTT355 : PREPARATORY TO PROCESSING OF TEXTILE LAB ( 0 0 2) credit 1

Bleaching and mercerization of cotton fabric and to evaluate the effectiveness of each process using various test such as Tewega test, drop absorption test, whiteness index, barium activity number test, measure wax content, ash content and scouring loss of cotton fabric.

### 9. BCC302 Python Programming (L T P 2 0 0) Credit 2

| Course Outcome ( CO) |  | Bloom's Knowledge Level (KL)    |
|----------------------|--|---------------------------------|
| CO1                  | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2                  | Express proficiency in the handling of strings and functions   | K <sub>1</sub> , K <sub>2</sub> |
| CO3                  | Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.   | K <sub>3</sub>                  |
| CO4                  | Identify the commonly used operations involving file systems and regular expressions.  | K <sub>1</sub> , K <sub>2</sub> |
| CO5                  | Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python  | K <sub>2</sub> , K <sub>3</sub> |
| Detailed Syllabus    |  |                                 |
| Unit                 | Topic  | Lecture                         |
| I                    | <b>Introduction to Python:</b> Python variables, Python basic Operators, Understanding python blocks. Python Data Types, Declaring and using Numeric data types: int, float etc.   | 03                              |
| II                   | <b>Python Program Flow Control Conditional blocks:</b> if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks.   | 05                              |
| III                  | <b>Python Complex data types:</b> Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python | 04                              |

|   |  |           |
|---|--|-----------|
|   | Functions, Organizing python codes using functions.  |           |
| IV  | <b>Python File Operations:</b> Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations. | <b>04</b> |
| V   | <b>Python packages:</b> Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tkinter introduction, Tkinter and PythonProgramming, Tk Widgets, Tkinter examples. Python programming with IDE.                       | <b>04</b> |
| <b>Text books:</b> <ol style="list-style-type: none"> <li>1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016</li> <li>2. Lambert, Fundamentals of Python: First Programs with MindTap, 2nd 1st edition , Cengage Learning publication</li> <li>3. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley, 2015</li> <li>4. Jeeva Jose &amp;P.SojanLal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Publishers, New Delhi,2016</li> <li>5. Downey, A. et al., “How to think like a Computer Scientist: Learning with Python”, John Wiley, 2015</li> <li>6. Mark Lutz, “Learning Python”, 5th edition, Orelly Publication, 2013, ISBN 978- 1449355739</li> <li>7. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology CengageLearning Publications, 2013, ISBN 978- 1590282410</li> <li>8. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage LearningPublications, 2013, ISBN 978-1435455009</li> <li>9. David Beazley, Brian Jones., “Python Cookbook”, Third Edition, Orelly Publication, 2013, ISBN 978-1449340377</li> </ol> |  |           |

## 10. BCC351: Internship Assessment / Mini Project Credit 2

## 4<sup>th</sup> Semester B. Tech. Textile Chemistry

### 1.0\_BAS 403: Mathematics-IV Probability & Statistics (L T P 3 1 0) Credit 4

Pre-requisites (if any): Knowledge of Mathematics I and II of B. Tech or equivalent

#### Course Outcomes

The objective of this course is to familiarize the students with partial differential equation, their application and statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

The students will learn:

- The idea of partial differential equation and its different types of solution.
- The concept of method of separation of variables and Fourier transform to solve partial differential equations.
- The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
- The idea of probability, random variables, discrete and continuous probability distributions and their properties.
- The statistical methods of studying data samples, hypothesis testing and statistical quality control.

#### Course Articulation Matrix of Mathematics-IV.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| 2    | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| 3    | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| 5    | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg. | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

#### *Module I: Partial Differential Equations*

8

Origin of Partial Differential Equations, Linear and Non-Linear Partial Differential Equations of first order, Lagrange's Equations method to solve Linear Partial Differential Equations, harpit's method to solve Non-Linear Partial Differential Equations, Solution of Linear Partial differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

#### *Module II: Applications of Partial Differential Equations and Fourier Transform*

8

Method of separation of variables, Solution of one dimensional heat equation, wave equation, Two dimensional heat equation (only Laplace Equation) and their application, Complex Fourier transform, Fourier sine transform, Fourier cosine transform, Inverse transform, convolution theorem, Application of Fourier Transform to solve partial differential equation.

### **Module III: Statistical Techniques I**

8

Overview of Measures of central tendency, Moments, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves, Correlation and Rank correlation, Regression Analysis: Regression lines of  $y$  on  $x$  and  $x$  on  $y$ .

### **Module IV: Statistical Techniques II**

8

Overview of Probability Random variables (Discrete and Continuous Random variable) Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poisson and Normal distributions.

### **Module V: Statistical Techniques III**

8

Introduction of Sampling Theory, Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, t-test, Z-test and Chi-square test, Statistical Quality Control (SQC), Control Charts, Control Charts for variables ( $\bar{X}$  and R Charts), Control Charts for Variables (p, np and C charts).

#### **Text Book:**

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 44<sup>th</sup> Edition, Khanna Publishers, New Dehli.

#### **Reference Book:**

1. Peter V. O'Neil, "Advance Engineering Mathematics", SI Edition 8<sup>th</sup> Edition, Cengage Learning, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publishing Company Ltd., 2017.
3. S. S. Sastry, "Introductory methods of Numerical solutions", 4th Edition, Prentice Hall of India.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley Publications, 1999.
5. R.K. Jain & S.R.K. Iyengar, "Numerical Methods", New Age International (P) Limited
6. James F. Epperson Mathematical Reviews "An Introduction To Numerical Methods And Analysis" Second Edition, Wiley;  
<https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf>

#### **Reference Books**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.
2. T. Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi.
3. R.K. Jain and S.R.K. Iyenger: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
4. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
5. D.N. Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; Kitab Mahal Distributers, New Delhi.

**2. BVE 401 : Universal Human Values & Professional ethics (2 1 0) 3 Credits Objectives:**

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content, and process of value education.
2. To help students initiate a process of dialog within themselves to know what they really want to be in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

**Course Outcome:**

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.
3. Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

**Catalogue Description:**

Every human being has two sets of questions to answer for his life: a) what to do? And, b) how to do?. The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self- exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfillment in the nature and the co- existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and professional ahead.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| CO 2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| Co 3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| Co 4 | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| CO5  | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg. | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

## **Unit 1:**

**Course Introduction-** Need, Basic Guidelines, Content, and Process for Value Education  
Understanding the need, basic guidelines, content, and process for Value Education, Self-Exploration– what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation –as the mechanism for self-exploration, Continuous Happiness, and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship, and Physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels..

## **Unit2: Understanding Harmony in the Human Being – Harmony in Myself**

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ – Sukh and Suvidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, program to ensure Sanyam and Swasthya.

## **Unit 3: Understanding Harmony in the Family and Society- Harmony in human-Human Relationship**

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva*as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*Sarvabhaum Vyavastha*)- from family to world family!.

## **Unit 4: Understanding Harmony in the Nature and Existence – Whole existence as Co-existence**

Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

## **Unit 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics**

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the

level of society: as mutually enriching institutions and organizations.

**Text Books:**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course 16lats16n Values and Professional Ethics.

**Reference Books:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. E G Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford UniversityPress
10. M Govindrajran, S Natrajan& V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co.,Lucknow. Reprinted2008.

**Mode of Evaluation:** Assignment / Project / Seminar / Continuous Assessment Test / Semester End Exam

**3 BTT403: TEXTILE FIBRE-II (L T P 2 1 0) Credits 3**

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Generate a general idea about synthetic fibres and their classification. Learning about general principles of fibre manufacturing. Conceptualize properties of fibre forming polymers, polymerization fundamentals, structure property relationships and changes during processing. |
| CO2 | Learn and understand about raw material requirements, polymerization and spinning technologies of different important synthetic fibres, e.g. Nylons, PET, PE, PP, Rayon, Acrylic.   |
| CO3 | Know about physical, chemical and other functional properties of the commercial fibres and carry out fundamental calculations related to synthetic fibre production.  |
| CO4 | Analyze factors affecting different physical and chemical properties of the fibres.   |
| CO5 | Develop idea of fibres for diversified applications for specific end use and requirements. Correlate fibre properties with end uses.  |

**Course Articulation Matrix of Textile Fibre-II:**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1  | 3   | 1   | 2   |     |     |     | 2   |     |     |      |      |      |
| 2  | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |



|      |   |   |   |   |   |   |   |  |  |  |  |   |
|------|---|---|---|---|---|---|---|--|--|--|--|---|
| 3    | 2 | 3 | 1 | 3 |   |   |   |  |  |  |  | 1 |
| 4    | 3 | 3 | 3 |   |   |   |   |  |  |  |  |   |
| 5    | 3 | 1 | 1 |   |   |   | 2 |  |  |  |  | 1 |
| Avg. | 3 | 3 | 2 | 3 | 2 | 1 | 2 |  |  |  |  | 1 |

**UNIT I:** Classification of man-made fibres, definition of regenerated and synthetic fibres, Concepts of molecular weight, methods of determination of MW, Degree of polymerization, Orientation and Crystallinity, Characteristics of fibre forming polymer. Study of some Characterization methods such as birefringence and DSC methods for property evaluation of produced fibres and polymeric materials. Introduction to methods of fibre formation by melt spinning, dry spinning, & wet spinning, important process parameters of spinning systems.

**UNIT II:** Polyethylene terephthalate fibre (PET) – History of development, Fundamentals of Step growth polymerization, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, physical & chemical properties of polyester fibres, applications.

**UNIT III:** Polyamide Fibres – History of development, Different types of polyamide fibres, Nylon polymer production by continuous polymerization in VK Tube, Manufacturing of Nylon 6 fibre by melt spinning, Properties of nylon 6 fibre, Polymer production of Nylon 66, Nylon 66- fibre formation by melt spinning, Physical & chemical properties and applications.

**UNIT IV:** Basic of Free radical polymerization, Polyacrylonitrile fibres, Polyurethane fibres brief manufacturing process by wet and dry spinning, physical and chemical properties of acrylic fibres & its applications, Properties of polyethylene fibre, Type of polypropylene (PP), Properties of polypropylene fibre. Introduction of high performance fibres.

**UNIT V:** Introduction to solution spinning and regenerated fibre, Raw material for viscose rayon, Manufacturing sequence of viscose fibre, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibres and Lyocell fibres.

**References:**

1. Gordon & Cook, Hand Book of Fibres, Vol II Merow Publication Ltd
2. Textiles, by Sara J. Kadolph
3. Manufactures fibre Technology, AK Gupta and VK Kothari
4. R.W. Moncrief, Man-Made Fibres- Heywood Books
5. Handbook of Properties of Textile and Technical Fibres, – A R Russel, (Textile Institute)
6. Textile Chemistry Vol I, by R H Peters
7. H V S Murthy, Textile Fibres- Textile Association Publication 1995.
8. V.A. Shenai, Textile Fibres- Vol-I Sevak Publications, Bombay, 1971

#### **4. BTT404: PRINCIPLES OF FABRIC MANUFACTURE ( L T P 3 1 0) Credits 4**

##### **UNIT I:**

Objects of winding process, working principles of automatic cone and cheese winders. Precision and drum winding machine, pirn winding, winding faults and remedies.

##### **UNIT II:**

Objectives warping process, working principles of Beam warping m/c. Sectional warping m/c, beaming, warper beam defects: cause and remedies.

##### **UNIT III**

Objectives sizing process, Slasher Sizing machine, Brief description of modern sizing machine with proper function of each essential part, multicylinder drying, hot air drying and unconventional drying of sized yarns, . Sizing ingredients used for cotton and synthetic yarns.

##### **UNIT IV**

Drawing-in process, Passage of material on handloom and power loom, Study and working principles of Handloom, Powerloom and Automatic Loom Primary, secondary and auxiliary motions of a power loom.

##### **UNIT V**

Comparison between shuttle and shuttleless looms, Basic concepts of shuttleless looms, Brief description of various shuttleless weft insertion principles, Fabric faults and remedies.

#### **References:**

1. Textiles (ATIRA) a. Winding b. Warping c. Sizing
2. Process control in warping, winding and sizing (ATIRA,BTRA)
3. Yarn preparation Vol. I & II R. Sengupta
4. Warp sizing by Rame Bottom
5. Yarn calculation by R. Sengupta

#### **5. BTT405: : TECHNOLOGY OF DYEING-I (L T P 3 1 0) Credits 4**

##### **UNIT I**

Classification of dyes according to the methods of application, general theory of dyeing, various methods of dyeing- Batch, Semi continuous, Continuous dyeing. Colour Index, nomenclature of commercial dyes and concept of percentage shade.

##### **UNIT II**

Dyeing of cellulosic fibres with direct dyes - mechanism of direct dyeing, effects of electrolytes and temperature on dyeing, process of application and after-treatments. Dyeing with reactive colours - basic concept, reactive dye types, nucleophilic reaction mechanisms for these dyes, complete application procedure for chlorotriazines and

vinylsulfones on cotton, industrial practices, bi-functional and polyfunctional reactive dyes.

### **UNIT III**

Dyeing of cellulosic fibres with Vat dyes-vatting, dyeing, oxidation, Solubled vat dyes. Sulphur dye dissolution, application, faults and remedies. Azoic-diazotization, naphtholation, coupling, Oxidation colour-aniline black, mineral colours-mineral khaki.

### **UNIT IV**

Dyeing of protein fibres – silk and wool with different types of acid dyes –its advantages and limitations, Metal Complex dyes- 1:1, 1:2, metal complex, Chrome dyes-pre, post & simultaneous mordanting, Basic Dyes.

### **UNIT V**

Dyeing of synthetic fibres: polyester-carrier, HTHP& thermosol method, Acrylic dyeing with basic dye, dyeing of Nylon and their blends. Problems associated with dyeing, Common fault and their remedies.

## **References:**

1. Dyeing and Chemical technology of Textile fibres – E R Trotman
2. Chemical processing of cotton and p/c blends – ATIRA
3. Technology of Dyeing by VA Shenai
4. Chemical technology of fibrous material by F. Shadov
5. Fundamentals and practices in colouration of textiles- J N Chakraborty (Woodhead Pub India)

## **6. BTT454: PRINCIPLES OF FABRIC MANUFACTURE LAB (L T P 0 0 2) Credit 1**

Study of cone winding, cheese winding, pirn winding and auto coner, constructional details of machine, types of packages produced by them and package faults, Calculations pertaining to cone winding, cheese winding, pirn winding Study of beam warping & sectional warping machine, stop motion and tensioners in warping, Calculations pertaining to warping machines.

Study of different types of looms, their constructional details, working of dobbie & jacquards.

## **7. BTT455: TECHNOLOGY OF DYEING-I LAB (L T P 0 0 2) Credit 1**

Dye cotton with direct, reactive, vat and sulphur dye, dyeing polyester, wool, silk, acrylic and nylon using appropriate disperse, acid and basic dyes, Study of effect of MLR in dyeing. Evaluate colour fastness to washing, light and rubbing.

## **8. BTT453: TEXTILE FIBRE-II LAB (L T P 0 0 2) Credit 1**

Principle of microscopy, microscopic identification of man-made fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of

homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

- Identification of Synthetic Fibres, namely Polyester, Nylon, Polypropylene, Acrylic fibres (microscopic views, burning tests and chemical dissolution methods)
- Determination of fineness of fibres by cutting and weighing methods
- Blend Analysis by Chemical means

## 9: BCC401 Cyber Security (2 0 0) Credit 2

| Course Outcome ( CO ) |   | Bloom's Knowledge Level (KL)    |
|-----------------------|---|---------------------------------|
| CO1                   | Understand the basic concepts of cyber security and cybercrimes.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2                   | Understand the security policies and cyber laws.  | K <sub>1</sub> , K <sub>2</sub> |
| CO3                   | Understand the tools and methods used in cyber crime  | K <sub>2</sub>                  |
| CO4                   | Understand the concepts of cyber forensics  | K <sub>1</sub> , K <sub>2</sub> |
| CO5                   | Understand the cyber security policies and cyber laws   | K <sub>2</sub>                  |
| Detailed Syllabus     |   |                                 |
| Unit                  | Topic   | Lecture                         |
| 1                     | <b>INTRODUCTION TO CYBER CRIME :</b> Cybercrime- Definition and Origins of the word Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.<br>Cyber offenses: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.   | 04                              |
| 2                     | <b>CYBER CRIME :</b> Mobile and Wireless Devices-Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era. | 04                              |
| 3                     | <b>TOOLS AND METHODS USED IN CYBERCRIME :</b> Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan-horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction to Phishing, Identity Theft (ID Theft).   | 04                              |
| 4                     | <b>UNDERSTANDING COMPUTER FORENSICS:</b> Introduction, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle,  | 04                              |

|  |   |           |
|--|---|-----------|
|  | Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation.<br>Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics   |           |
| 5  | <b>INTRODUCTION TO SECURITY POLICIES AND CYBER LAWS :</b><br>Need for An Information Security Policy, Introduction to Indian Cyber Law, Objective and Scope of the Digital Personal Data Protection Act 2023, Intellectual Property Issues, Overview of Intellectual Property Related Legislation in India, Patent, Copyright, Trademarks | <b>04</b> |
| <p><b>Text books:</b></p> <ol style="list-style-type: none"> <li>1. Sunit Belapure and Nina Godbole, “Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, Publish Date 2013.</li> <li>2. Basta, Basta, Brown, Kumar, Cyber Security and Cyber Laws, 1st edition , Cengage Learning publication</li> <li>3. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla, KLSI. “Introduction to information security and cyberlaws”. Dreamtech Press. ISBN: 9789351194736, 2015.</li> <li>4. Cyber Security and Data Privacy by Krishan Kumar Goyal , Amit Garg , Saurabh Singhal , HP HAMILTON LIMITED Publication, ISBN-13-978-1913936020</li> <li>5. Thomas J. Mowbray, “Cybersecurity: Managing Systems, Conducting Testing</li> <li>6. Investigating Intrusions”, Copyright © 2014 by John Wiley &amp; Sons, Inc, ISBN: 978 - 1-118 -84965 - 1.</li> <li>7. James Graham, Ryan Olson, Rick Howard, “Cyber Security Essentials”, CRC Press, 15-Dec 2010. Anti- Hacker Tool Kit (Indian Edition) by Mike Shema, McGraw-Hill Publication.</li> </ol> |   |           |

**10: BVE451 - Sports and Yoga-II: (0 0 3) Non Credit**

# **SYLLABUS**

**Uttar Pradesh Textile Technology Institute, Kanpur**

**Affiliated to**

**DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**



**PROPOSED STUDY & EVALUATION SCHEME  
FOR  
2<sup>ND</sup> B. TECH. TEXTILE ENGINEERING**

**On**

**AICTE B. Tech Model Curriculum Structure &  
Syllabus**

**(Effective from the Session: 2023-24)**

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup>Year B. Tech Textile Engineering**  
**Uttar Pradesh Textile Technology Institute Kanpur**

Affiliated to

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year III-Semester**

**Effective from Session-2023-24**

| Sl. No. | Subject Codes   | Subject                                      | Periods   |          |          | Evaluation Scheme |            |            |            | End Semester |            | Total       | Credit    |
|---------|-----------------|--|-----------|----------|----------|-------------------|------------|------------|------------|--------------|------------|-------------|-----------|
|         |                 |  | L         | T        | P        | CT                | TA         | Total      | PS         | TE           | PE         |             |           |
| 1       | BAS303          | Math IV                                      | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 2       | BVE301          | Universal Human Values & professional Ethics | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 3       | BTT301          | Yarn Manufacturing-I                         | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 4       | BTT302          | Fabric Manufacturing-I                       | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 5       | BTT303          | Textile Fibre-I                              | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 6       | BTT351          | Yarn Manufacturing-I Lab                     | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 7       | BTT352          | Fabric Manufacturing-I Lab                   | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 8       | BTT353          | Textile Fibre-I Lab                          | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 9       | BCC301          | Cyber Security                               | 2         | 0        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 2         |
| 10      | BCC351          | Internship Assessment / Mini Project*        | 0         | 0        | 0        |                   | 100        | 100        |            |              |            | 100         | 2         |
| 11      | BVE351 / BVE352 | Sports and Yoga-II/ NSS-II                   | 0         | 0        | 3        |                   |            |            | 100        |              |            | 100         | 0*        |
|         |                 | <b>Total</b>                                 | <b>15</b> | <b>5</b> | <b>6</b> | <b>120</b>        | <b>160</b> | <b>280</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>1000</b> | <b>25</b> |

**Study & Evaluation Scheme (MCS)**  
**2<sup>nd</sup>Year B. Tech. Textile Engineering**  
**Uttar Pradesh Textile Technology Institute Kanpur**  
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**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year IV-Semester**

**Effective from Session-2023-24**

| Sl. No.  | Subject Codes   | Subject                                      | Periods   |          |          | Evaluation Scheme |           |            |            | End Semester |            | Total      | Credit    |
|--|-----------------|--|-----------|----------|----------|-------------------|-----------|------------|------------|--------------|------------|------------|-----------|
|  |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
|  |                 |  | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |
| 1  | BOE411          | Polymer Science and Technology               | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 2  | BAS401          | Technical Communication                      | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 3  | BTT401          | Yarn Manufacturing-II                        | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 4  | BTT402          | Fabric Manufacturing-II                      | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |
| 5  | BTT403          | Textile Fibre-II                             | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |
| 6  | BTT451          | Yarn Manufacturing-II Lab                    | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 7  | BTT452          | Fabric Manufacturing-II Lab                  | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 8  | BTT453          | Textile Fibre-II Lab                         | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |
| 9  | BCC402          | Python Programming                           | 2         | 0        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 2         |
| 10   | BVE451 / BVE452 | Sports and Yoga-II/ NSS-II                   | 0         | 0        | 3        |                   |           |            | 100        |              |            | 100        | 0*        |
|  |                 | <b>Minor Degree/ Honors Degree MT1/ HT-1</b> |           |          |          |                   |           |            |            |              |            |            |           |
|  |                 | <b>Total</b>                                 | <b>15</b> | <b>5</b> | <b>9</b> | <b>120</b>        | <b>60</b> | <b>180</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>900</b> | <b>23</b> |
| * The Mini Project or internship (4 weeks) will be done during summer break after 4th Semester and will be assessed during V semester. |                 |  |           |          |          |                   |           |            |            |              |            |            |           |



## 3<sup>rd</sup> Semester B. Tech. Textile Engineering

### 1.0 BAS 303: Mathematics-IV Probability & Statistics (L T P 3 1 0) Credit 4

Pre-requisites (if any): Knowledge of Mathematics I and II of B. Tech or equivalent

#### Course Outcomes

The objective of this course is to familiarize the students with partial differential equation, their application and statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

The students will learn:

- The idea of partial differential equation and its different types of solution.
- The concept of method of separation of variables and Fourier transform to solve partial differential equations.
- The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
- The idea of probability, random variables, discrete and continuous probability distributions and their properties.
- The statistical methods of studying data samples, hypothesis testing and statistical quality control.

#### Course Articulation Matrix of Mathematics-IV.

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BAS-303.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BAS-303.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BAS-303.4 | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

#### *Module I: Partial Differential Equations*

8

Origin of Partial Differential Equations, Linear and Non-Linear Partial Differential Equations of first order, Lagrange's Equations method to solve Linear Partial Differential Equations, harpit's method to solve Non-Linear Partial Differential Equations, Solution of Linear Partial differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

#### *Module II: Applications of Partial Differential Equations and Fourier Transform*

8

Method of separation of variables, Solution of one dimensional heat equation, wave equation, Two dimensional heat equation (only Laplace Equation) and their application, Complex Fourier transform, Fourier sine transform, Fourier cosine transform, Inverse transform, convolution theorem, Application of Fourier Transform to solve partial differential equation.

**Module III: Statistical Techniques I**

8

Overview of Measures of central tendency, Moments, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves, Correlation and Rank correlation, Regression Analysis: Regression lines of  $y$  on  $x$  and  $x$  on  $y$ .

**Module IV: Statistical Techniques II**

8

Overview of Probability Random variables (Discrete and Continuous Random variable) Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poisson and Normal distributions.

**Module V: Statistical Techniques III**

8

Introduction of Sampling Theory, Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, t-test, Z-test and Chi-square test, Statistical Quality Control (SQC), Control Charts, Control Charts for variables (X and R Charts), Control Charts for Variables (p, np and C charts).

**Text Book:**

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 44<sup>th</sup> Edition, Khanna Publishers, New Delhi.

**Reference Book:**

1. Peter V. O'Neil, "Advance Engineering Mathematics", SI Edition 8<sup>th</sup> Edition, Cengage Learning, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publishing Company Ltd., 2017.
3. S. S. Sastry, "Introductory methods of Numerical solutions", 4th Edition, Prentice Hall of India.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley Publications, 1999.
5. R.K. Jain & S.R.K. Iyengar, "Numerical Methods", New Age International (P) Limited
6. James F. Epperson Mathematical Reviews "An Introduction To Numerical Methods and Analysis" Second Edition, Wiley;  
<https://perhuman.files.wordpress.com/2014/07/metodos-numericos.pdf>

**Reference Books**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.
2. T. Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi.
3. R.K. Jain and S.R.K. Iyengar: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
4. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
5. D.N. Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; Kitab Mahal Distributors, New Delhi.

## 2. BVE301 : Universal Human Values & Professional ethics (2 1 0) 3 Credits

### Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content, and process of value education.
2. To help students initiate a process of dialog within themselves to know what they really want to be in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

### Course Outcome:

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.
3. Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

### Catalogue Description:

Every human being has two sets of questions to answer for his life: a) what to do? And, b) how to do? The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self- exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfilment in the nature and the co- existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and professional ahead.

| CO           | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 0 | PO1 1 | PO1 2 |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| BVE301/401.1 | 2    | 3    | 3    | 3    | 2    |      |      |      |      |      |       | 3     |
| BVE301/401.2 | 3    | 2    | 2    | 2    | 1    |      |      |      |      |      |       | 2     |

|                  |   |   |   |   |   |  |  |  |  |  |  |   |
|------------------|---|---|---|---|---|--|--|--|--|--|--|---|
| BVE301/401.<br>3 | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 1 |
| BVE301/401.<br>4 | 3 | 3 | 2 | 1 | 2 |  |  |  |  |  |  | 3 |
| BVE301/401.<br>5 | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  | 3 |
| Avg.             | 3 | 3 | 2 | 2 | 2 |  |  |  |  |  |  | 2 |

### Unit 1:

**Course Introduction-** Need, Basic Guidelines, Content, and Process for Value Education  
Understanding the need, basic guidelines, content, and process for Value Education, Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation – as the mechanism for self-exploration, Continuous Happiness, and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship, and Physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels..

### Unit2: Understanding Harmony in the Human Being – Harmony in Myself

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ – Sukh and Savidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, program to ensure Sanyam and Swasthya.

### Unit 3: Understanding Harmony in the Family and Society- Harmony in human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*Sarvabhaum Vyawastha*)- from family to world family!.

### Unit 4: Understanding Harmony in the Nature and Existence – Whole existence as Co-existence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

### Unit 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

**Text Books:**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course 8lats8n Values and Professional Ethics.

**Reference Books:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome’s report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

**Mode of Evaluation:** Assignment / Project / Seminar / Continuous Assessment Test / Semester End Exam

**3. BTT301: YARN MANUFACTURE-I (L T P 3 1 0) Credit 4**

| Sr. No. | Course Code | Course             | Semester | Year                         |
|---------|-------------|--------------------|----------|------------------------------|
| 03      | BTT-301     | Yarn Manufacture-I | III      | 2 <sup>nd</sup> . Y. B. Tech |

|     |   |
|-----|---|
| CO1 | Explain the importance of ginning & select ginning machine for different types of cotton. |
|-----|---|

|     |   |
|-----|---|
| CO2 | Explain the principles involved in opening & cleaning machines in blow room.        |
| CO3 | Explain principles involved in carding  |
| CO4 | Explain autollevelling concept of card & Calculate production & efficiency of card. |
| CO5 | Explain the principle of drafting & doubling & role of draw frame & its calculation |

**Course Articulation Matrix of Yarn Manufacture-I:**

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BTT-301.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BTT-301.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BTT-301.4 | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**UNIT I:** - Introduction of ginning process, Functions of ginning machines, Types of Ginning machines, Objects of mixing, different types of mixing & blending, Difference between mixing & blending, : Objects of Blow room for natural and synthetic fibres, Principles of opening and cleaning, Principles of various opening and cleaning machines of blow room line, Various components & zones of blow room machines, Conventional blow room machines. Lap forming mechanism,

**UNIT II:** Automation and concept of modern blow room line, Latest developments in Blow room machines, Automatic bale opener, Mild openers– Maxi-flow/ Uni-clean/Vario-clean, modern Blenders, Intensive openers, cleanomat, flexi-clean, Waste extracted at various openers and beaters, Cleaning efficiency of different machines, nep generation,

**UNIT III:** Principle and concept of chute feed to card. Advantages and limitations, study of design details of different types of chute feeding systems, Objects of carding, detailed description of various parts of carding machine, **Carding theory**–Opening of fibre mass–Carding actions, –Web formation and fibre configuration, blending action, .

**UNIT IV:**, Card clothing, , carding defects, Roller cards, Tandem carding, Auto-leveller used in carding, Modern development in carding. Calculations related to blow room & card.

**Unit V:** Functions of draw-frame, principles of drafting and doubling, Study of constructional details and design of drafting systems, weighting in draw frame, draft distribution, drafting force, details of drafting system, Coiling system and stop motion, blending at draw-frame, maintenance of draw frame, such as rollers, roller weightings, drafting systems etc, Auto leveling at draw-frame. On- line quality monitoring and control, Developments in draw frame drafting, calculations relating draw frame,

**References:**

- W.Klein. The Textile Institute Publication – Manual of Textile

Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993

- P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
- E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
- C Shringley, ‘Opening and Cleaning’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
- I Doraiswamy. ‘Cotton Ginning’, Textile Progress, Textile Institute Publication. 1993
- R Chattopadhyay, Blow-room and Carding- Training Programme conducted by NCUTE, IIT, Delhi. 1999

#### 4. BTT302-FABRIC MANUFACTURE-I ( L T P 3 1 0) Credit 4

**Course Outcome:** After completing the course student will be able to:

|     |  |
|-----|--|
| CO1 | Explain and explain the objectives of winding, warping & Sizing                                |
| CO2 | Be able to explain the principles of winding, sectional warping, beam warping                  |
| CO3 | Able to calculate the production of winding, warping & sizing machines & material balance      |
| CO4 | Able to explain the concepts of stop motions, cutters, control systems in different machine    |
| CO5 | Decide the size recipe for different types of fibres and yarn, developments in sizing machines |

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 2   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |
| 2    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 3   | 2   |     |     |     |     |      |      | 2    |
| 4    | 3   | 3   | 2   | 2   | 3   |     |     |     |     |      |      | 1    |
| 5    | 2   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |
| Avg. | 3   | 2   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**UNIT I:** Objects of winding process, classification of winding, (manual & automatic), various latest winding machines with detailed construction and working, Description of various winding accessories.

**UNIT II:** Drum and spindle driven winding= mechanism, motions of wound and supply packages, package building mechanism, digi-cone winder, winding package faults & their prevention, Geometrical aspects: - Cone angle, coil angle, wind ratio, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, calculations: winding speed, production/spindle & per machine, and efficiency.

**UNIT III:** Objectives of pirn winding, its advantage over rewound weft, Pirn build: - length of wind, chase length, diameter, bunch, tail ends etc. their importance during weaving process. Yarn tensioning- types and their mechanism. Winding and unwinding tension variation, Yarn clearing-principle and measurement. Yarn imperfections, faults and splicing. Classimat representation

**UNIT IV:** Objectives of warping, precautions to be considered in the process,

classification of warping process- (beam warping, sectional warping, ball warping), Latest Warping machine: - construction and working, Creel: - framing (requirements, length, height, pitch, etc.) pegs, tensioning arrangements guides, blow fan, types of creels(parallel, V, V-nose etc.), Waxing attachment, computerized warping machines. Warping efficiency with different creels.

**UNIT V:** Objectives of sizing and sizing terminology, achieving the objectives through sizing paste constituents, concepts of sizing process: pre-wetting, sizing, splitting and drying, hank sizing, ball warp sizing, cold sizing , hot-melt sizing, Slasher sizing, multi- cylinder sizing, description of sizing ingredients and factors affecting sizing efficiency, Latest developments in sizing process by various sizing machine manufacturers.

**References:**

- M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
- R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
- M K Talukdar, P K Sriramalu, D B Ajgaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
- K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
- R Sengupta. **Yarn Preparation-Vol.-I and Vol-II**. University of Mishigan, Popular Prakashan, 1963
- J.E. Booth Textile Mathematics-Vol. I, II &III Published by The Textile Institute Manchester, 1975
- B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc.,US; 6th edition (1 March 1983)
- P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

**5 BTT303: TEXTILE FIBRE-I (L T P 2 1 0) Credit 3**

**Course Outcome:** After completing the course student will be able to:

|     |  |
|-----|--|
| CO1 | Generate a general idea about Natural fibres and their classification. Define and explain textile fibre properties in general, able to give fundamentals of major characterization techniques of textile fibres and polymers, explain fibre yarn and fabric property relationships, explain essential and desirable properties   |
| CO2 | Describe their origin of and agricultural methods of production of fibres,compare properties of these fibres. Explain Polymer systems, morphological and analysefine structure, explain basics XRD results, electron microscopes, describe chemical components and relevant reactions, importance in processing, explain application in relation to properties of fibres.. |
| CO3 | Classify natural protein fibres (wool and Silk) in detail by various means, by geographical origin and genetic, explain Growth of wool and basic sericulture. Describe morphological structure, polymer system of wool and silk, & their characterization.   |



|     |   |
|-----|---|
| CO4 | State, understand and explain general properties of Wool fibres (Physical and chemical), relate fibre properties with application. Compare Wool and silk and other fibres in terms of application and properties. |
| CO5 | State and explain general properties of Silk fibres (Physical and chemical), correlate them with application. Describe modification of wool and silk fibres.  |

### Course Articulation Matrix of Textile Fibre-I:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 4    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 5    | 3   | 3   | 2   | 3   | 2   | 2   | 2   |     |     |      |      |      |
| Avg. | 3   | 3   | 3   | 3   | 3   | 2   | 2   |     |     |      |      | 1    |

**UNIT I:** Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man-made fibres. General Testing Methods and Characterization techniques, general properties of fibres. Moisture relations in textiles.

**UNIT II:** Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

**UNIT III:** Flax/Jute/Ramie cultivation, retting and extraction process, grading, Fibre structure of jute and flax, chemical compositions, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like hemp, banana, bamboo fibre etc.

**UNIT IV:** Types of wool and its grading, Classification and Origin, Morphological structure (bilateral, scaly structure, ortho and paracortex), chemical (protein) composition, effect on properties, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc.

**UNIT V:** Types of silk and its production, chemical composition, polymer systems, molecular and morphological structure of silk, physical & chemical properties of silk and its applications.

### References:

- Shakyawar DB and Singh MK., Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
- J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
- R W Moncrieff., Man Made Fibre, 5<sup>th</sup> Edition, Publisher Unknown, 1970-
- R H Peters Textile Chemistry Vol I The Chemistry of Fibres . Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)

- A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
- V A Sehnaï. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
- Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

#### **6. BTT351: YARN MANUFACTURE-I LAB (0 0 2) Credit 1**

1. To determine trash content% and analysis of waste by using trash analyzer
2. To study and sketch general outline of opener, cleaner and mix/ blender in blow room
3. To study feed regulating mechanism in blow room
4. To study different setting point on blow room
5. To determine cleaning efficiency of blow line
6. To study and sketch the working mechanism of various operations of a card
7. To study different settings of the card
8. To study gearing plan and calculate draft constant and production constant of card
9. To study nep removal efficiency of card
10. To study various types of waste in card and its analysis

#### **7. BTT352: FABRIC MANUFACTURE-I LAB ( 0 0 2) credit 1**

1. Study of weaving preparatory and weaving processes
2. Study of loom drive, loom timing, passage of material and primary motions.
3. Study of precision winding machine
4. Study of drum winding machine.
5. Study of cheese winding machine.
6. Study of various types of yarn tensioners used in winding
7. Study of autoconer and its functions
8. Study of pirn winding machine
9. Study of sectional warping machine
10. Study of beam warping machine

#### **8. BTT353: TEXTILE FIBRE-I Lab (0 0 2) Credit 1**

Principle of microscopy, microscopic identification of natural fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

- Identification of Natural Fibres, namely Cotton, Wool, Silk, Jute
- Determination of fineness of fibres
- Blend Analysis by chemical means

## 9. BCC301 Cyber Security (2 0 0) Credit 2

| Course Outcome ( CO )  |   | Bloom's Knowledge Level (KL)    |
|--|---|---------------------------------|
| CO1  | Understand the basic concepts of cyber security and cybercrimes.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2  | Understand the security policies and cyber laws.  | K <sub>1</sub> , K <sub>2</sub> |
| CO3  | Understand the tools and methods used in cyber crime  | K <sub>2</sub>                  |
| CO4  | Understand the concepts of cyber forensics  | K <sub>1</sub> , K <sub>2</sub> |
| CO5  | Understand the cyber security policies and cyber laws   | K <sub>2</sub>                  |
| Detailed Syllabus  |   |                                 |
| Unit   | Topic   | Lecture                         |
| 1  | <b>INTRODUCTION TO CYBER CRIME :</b> Cybercrime- Definition and Origins of the word Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.<br>Cyber offenses: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.  | 04                              |
| 2  | <b>CYBER CRIME :</b> Mobile and Wireless Devices-Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era. | 04                              |
| 3  | <b>TOOLS AND METHODS USED IN CYBERCRIME :</b> Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan-horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction to Phishing, Identity Theft (ID Theft).   | 04                              |
| 4  | <b>UNDERSTANDING COMPUTER FORENSICS :</b> Introduction, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation.<br>Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics   | 04                              |
| 5  | <b>INTRODUCTION TO SECURITY POLICIES AND CYBER LAWS :</b><br>Need for An Information Security Policy, Introduction to Indian Cyber Law, Objective and Scope of the Digital Personal Data Protection Act 2023, Intellectual Property Issues, Overview of Intellectual Property Related Legislation in India, Patent, Copyright, Trademarks   | 04                              |
| <b>Text books:</b>   |   |                                 |
| 1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, |   |                                 |

Computer Forensics and Legal Perspectives”, Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, Publish Date 2013.

2. Basta, Basta, Brown, Kumar, Cyber Security and Cyber Laws, 1st Edition, Cengage Learning publication
3. Dr. Surya PrakashTripathi, RitendraGoyal, Praveen Kumar Shukla, KLSI. “Introduction to information security and cyberlaws”. Dreamtech Press. ISBN: 9789351194736, 2015.
4. Cyber Security and Data Privacy by Krishan Kumar Goyal , Amit Garg , Saurabh Singhal , HP HAMILTON LIMITED Publication,ISBN-13-978-1913936020
5. Thomas J. Mowbray, “Cybersecurity: Managing Systems, Conducting Testing
6. Investigating Intrusions”, Copyright © 2014 by John Wiley & Sons, Inc, ISBN: 978 - 1-118 -84965 - 1.
7. James Graham, Ryan Olson, Rick Howard, “Cyber Security Essentials”, CRC Press, 15-Dec 2010. Anti- Hacker Tool Kit (Indian Edition) by Mike Shema, McGraw-Hill Publication.

## **10 BCC351 : Internship Assessment / Mini Project\* Credit 2**

## 4<sup>th</sup> Semester B. Tech. Textile Engineering

### 1. BOE411: Polymer Science & Technology (SBOE): (L T P 3 1 0) Credit 4

#### *Course Aim*

The aim of this course is to provide students with a comprehensive view of polymer science and technology, including the chemical structure of various polymers, methods of measuring the molecular weight, polymerization kinetics, and polymer processing technologies. The focus is mainly on processing of polymers as well as on the behaviour and technical applications of different polymeric materials.

#### *Course Objectives:*

To provide fundamental and applied knowledge of polymers and their synthesis, manufacturing, processing, characterization and applications of polymers in space, oceans, electronics, agriculture, automobile, sports and building constructions.

**Course Outcomes:** Upon completion of this course, the students will be able to:

| Units CO | Course Outcome  | Bloom's Level |
|----------|---|---------------|
| CO1      | Understand the concept of polymer synthesis, Functionality, Crystallinity, Calculation of average molecular weight, reaction kinetics, physical properties and factors affecting the strength of polymers | K4            |
| CO2      | Understand the properties of polymers, types and mechanism of polymerization  | K3            |
| CO3      | Understand and apply the various processing and manufacturing techniques, high performance polymer  | K3            |
| Co4      | Understand the preparation, properties and technical applications of polymers   | K3            |
| CO5      | Understand the applications of different polymeric materials in current scenario of development   | K3            |

| Unit | Topics  | Lectures/ Hours |
|------|---|-----------------|
| 1    | Introduction, Chemistry of Polymer Synthesis, Classification, Functionality, Tacticity, Crystallinity in Polymers and its Effect on Properties of Polymers, Concepts of Average Molecular Weight in Polymers, Polymer Reaction Kinetics, Physical Properties, Factors Affecting Strength. | 8               |
| 2    | Effect of Structure on Properties of Polymers, Organic Polymers, Step Growth and Chain Growth Polymerization and its Mechanism, Coordination, Polymerization, Copolymerization  | 8               |
| 3    | Polymer Processing, Injection, Moulding, Blow Moulding, Compression Moulding, Introduction to High Performance Polymers and Polymer Composites.   | 8               |
| 4    | , Properties and Technical Applications of Thermoplastic (PVC, PVA, PTEE), Thermostats (PF, UF, MF) and Elastomers (SBR, Nitril Rubber, Butyl Rubber, Polychloroprene), Vulcanization of Rubber and its advantages, Biopolymers and Degradation of Polymers                               | 8               |
| 5    | Epoxy Resins, Silicones, Application of Polymer in Space, Ocean, Electronics Medical, Agriculture, Automobile, Sports and Building Construction   | 8               |

**Text Books:**

1. Polymer Science, Wiley & Sons, 3<sup>rd</sup> Edition, By Billmeyer, F.W. Jr. ISBN: 978-8126511105 (2007).
2. Fundamentals of Polymers, McGraw Hill By Kumar, A., Gupta, R. K. ISBN: 0-8247-0867-9 (2003).
3. Polymer Science and Technology, 3<sup>rd</sup> Edition, Prentice Hall By Joel R Fried, ISBN: 978-0-13-703955-5, (2014).
4. Polymer Science and Technology, 1<sup>st</sup> Edition, CRC Press Inc By Robert O Ebewe, ISBN: 978-0849389399 (2000).
5. Polymer Science and Technology, 3<sup>rd</sup> Edition, McGraw Hill Education (India) Private Limited, By Ghosh Premamoy, ISBN: 978-0070707047 (2011).

**Reference Books:**

1. Principles of Polymer Processing, 2<sup>nd</sup> Edition, Wiley Interscience, Tadmo, Z; Gogos, C.G., ISBN: 0-471-38770-3 (2006).
  2. Polymer Science and Engineering, Prentice Hall of India, Williams, D. J., ISBN: 978-0136856368 (1971).
- Handbook of Polymer Science and Technology, 1<sup>st</sup> Volume, 1<sup>st</sup> Edition, CBS Publication by Ferry MH, ISBN: 978-8123911328 (2012)

**2. BAS 401: Technical Communication (L T P 2 1 0) Credit 3****Course Objectives**

1. Explain the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Enhance confidence in face of diverse audience.
4. Create a vast know-how of the application of the learning to promote their technical competence.
5. Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 2    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 3    |     |     |     |     |     |     |     |     |     | 3    |      | 1    |
| 4    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 5    |     |     |     |     |     |     |     |     |     | 2    |      | 2    |
| Avg. |     |     |     |     |     |     |     |     |     | 3    |      |      |

**Unit 1 : Fundamentals of Communication and Voice Dynamics:**

Role and Purpose of Communication, Types & Flow of Communication, Barriers to Effective Communication,  
7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds, Tone: Rising and Falling Tone.

**Unit 2 : Communication Skills for Career Building**

CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.

### **Unit 3: Communication Skills for Presentation: Writing, Designing, and Speaking**

Thesis and Project Report Writing, Technical Proposal Writing, how to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.

### **Unit 4 : Communication and Leadership Development**

Leadership Communication, Communication and Social competence: context, feelings, intentions, behaviours, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.

### **Unit 5 : Digital Communication and Personality Making**

Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of Personality; Concept of Personality: Maslow, Freud, Vivekananda, Jung Typology & Personality Assessment.

#### **Prescribed Books:**

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2018, New Delhi
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Technical Communication, by Pfeiffer, 6<sup>th</sup> edn (Pearson)
4. Soft Skills & Employability, Sabina Pillai and Agna Fernandez Cambridge University Press 2018.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S.Publications India Ltd.; Krishan Nagar, 2014, Delhi.

#### **Web link/ free resources for reference:**

- <https://online.hbs.edu/blog/post/leadership-communication>
- <https://blog.hubspot.com/marketing/content-creation>
- <https://vincenttriola.com/blogs/ten-years-of-academic-writing/sigmund-freud-carl-jung-carl-rogers-abraham-maslow>
- <https://www.verywellmind.com/jungs-theory-of-personality-learning-styles-2795160>
- <https://www.humanmetrics.com/personality>
- <https://hbr.org/2022/11/how-great-leaders-communicate>

### **3 BTT401: YARN MANUFACTURE-II (L T P 3 1 0) Credits 4**

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Identify the importance of preparatory process for combing, the parameters in preparatory process for combing & its influence on combing  |
| CO2 | Elaborate the concept & mechanism involved in combing & demonstrate different comber setting for different types of combing   |
| CO3 | Explain the role of roving process, concept of twisting & winding, building mechanism & able to calculate draft, twist, production & other parameters related to D/F, comber & roving frame |
| CO4 | Explain the principle of ring spinning & building of cop  |
| CO5 | Explain the role of different parts, developments in ring spinning  |

#### **Course Articulation Matrix of Yarn Manufacture-II:**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|

|      |   |   |   |   |   |  |  |  |  |  |  |   |
|------|---|---|---|---|---|--|--|--|--|--|--|---|
| 1    | 2 | 3 | 3 | 3 | 1 |  |  |  |  |  |  | 3 |
| 2    | 3 | 3 | 3 | 2 | 2 |  |  |  |  |  |  | 2 |
| 3    | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 3 |
| 4    | 3 | 3 | 3 | 1 | 2 |  |  |  |  |  |  | 2 |
| 5    | 3 | 2 | 3 | 3 | 3 |  |  |  |  |  |  | 2 |
| Avg. | 3 | 3 | 3 | 2 | 2 |  |  |  |  |  |  | 2 |

**UNIT I:** Objects of combing process, Requirements of good lap – importance of number of passages, importance of good lap, linear density of lap, etc., Methods of comber lap preparation – Different sequences of comber lap preparation, study of sliver lap machine, ribbon lap machine, unilap machine, Developments in lap preparation machines.

**UNIT II:** Constructional details of different Comber (for cotton and worsted)- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber, Study of combing cycle, Forward and backward combing, Comber Settings, Norms for production, speed, Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality, Developments in combing.

**UNIT III:** Objects of speed frame, Concepts of drafting, twisting and winding process. Constructional aspects of Speed-frame – Creel, top arm apron drafting system, Spindle & flyer assembly, stop motions. differential motion in speed frame, building mechanism, Developments in speed frame, Calculation related to speed frame.

**Unit IV:** Objectives & principles of ring spinning machines, constructional features & identification of different parts, principle of drafting systems & weighting system in ring frame, twisting winding & building operation, forces acting between ring & traveler, limiting speed of traveler, yarn tension in ring spinning, classification, form of traveler, traveler mass & material,

**Unit V:** Different types of ring, different ring traveler combination, fibre lubrication, running-in of new ring, winding process, cop structure, spinning geometry, causes of end breakage, recent development in ring spinning, calculation related to speed, draft, twist, production & efficiency in ring spinning

#### References:

1. W.Klein. The Textile Institute Publication – Manual of Textile Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993
2. P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
3. E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
4. C Shringley, Draw frame, Speed frame’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
5. R Chattopadhyay, Draw frame, Speed frame - Training Programme conducted by NCUTE, IIT, Delhi. 1999



#### 4 BTT402: FABRIC MANUFACTURE-II (L T P 3 1 0) Credits 4

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Explain objectives of drawing-in, limitations of knotting   |
| CO2 | Explain & able to explain primary & secondary motions involved in loom, different methods of shedding & picking, different types of let-off & take-up mechanism |
| CO3 | Explain & explain tappet, Dobby & jacquard looms & their uses & mechanism involved in it.   |
| CO4 | Explain mechanism involved in terry, working of drop box loom, pick at will loom, various stop motions involved in loom   |

**Course Articulation Matrix of Fabric Manufacture-II:**

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   |     |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 2   | 1   |     |     |     |     |     |      |      | 2    |
| 5    | 2   | 3   | 3   | 2   | 1   |     |     |     |     |      |      | 1    |
| Avg. | 3   | 3   | 3   | 1   | 1   |     |     |     |     |      |      | 1    |

**UNIT I:** Drawing-in: Objectives, process description, reed count system, manual drawing-in, semi-automatic drawing-in process, Knotting process and its limitations. Various methods of fabric manufacture and automatic weaving: - Weaving, knitting, braiding, non-woven, brief description of all methods and processes involved in it,

**UNIT II:** Different kinds of fabrics: Grey, mono-colour, multi-colour, warp or weft stripes, checks etc., General description of plain power looms, introduction to weaving process, primary, secondary and auxiliary motion of plain power looms, Various ways of shedding, over and under pick motion, tappet shedding,

**UNIT III:** Temples and its utility, idea about healds count and reed count in different system, Negative and positive take up motion, five wheel and seven wheel take up motion and positive let-off motions, Calculations: -Production and efficiency of machine.

Unit IV: Scope & limitation of doobby, negative and positive doobby, cross border doobby, Development in doobby, Scope and limitations doobby, brief description of Crompton and Knowles doobby, cross border doobby, method of pegging for doobby, methods of pegging, heald reversing motion. Warp protective devices, side and centre weft fork motion.

**UNIT V:** Jacquards shedding, types of jacquards and their principle of working, size and figuring capacity of jacquard, cross border jacquards. Single lift single cylinder Jacquard, Double lift single cylinder, Double lift double cylinder, split harness, Different system of harness tie-up, terry mechanism, Recent developments in jacquard weaving.

**References:**

1. M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
2. R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
3. M K Talukdar, P K Sriramalu, D B Ajgaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
4. K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
5. R Sengupta. **Yarn Preparation-Vol.-I and Vol.-II**. University of Mishigan, Popular Prakashan, 1963
6. J.E. Booth Textile Mathematics-Vol. I, II & III Published by The Textile Institute Manchester, 1975

7. B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc., US; 6th edition (1 March 1983)
8. P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

### 5. BTT403: TEXTILE FIBRE-II (L T P 2 1 0) Credits 3

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Generate a general idea about synthetic fibres and their classification. Learning about general principles of fibre manufacturing. Conceptualize properties of fibre forming polymers, polymerization fundamentals, structure property relationships and changes during processing. |
| CO2 | Learn and understand about raw material requirements, polymerization and spinning technologies of different important synthetic fibres, e.g. Nylons, PET, PE, PP, Rayon, Acrylic.   |
| CO3 | Know about physical, chemical and other functional properties of the commercial fibres and carry out fundamental calculations related to synthetic fibre production.  |
| CO4 | Analyze factors affecting different physical and chemical properties of the fibres.   |
| CO5 | Develop idea of fibres for diversified applications for specific end use and requirements. Correlate fibre properties with end uses.  |

#### Course Articulation Matrix of Textile Fibre-II:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 1   | 2   |     |     |     | 2   |     |     |      |      |      |
| 2    | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |
| 3    | 2   | 3   | 1   | 3   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 3   |     |     |     |     |     |     |      |      |      |
| 5    | 3   | 1   | 1   |     |     |     | 2   |     |     |      |      | 1    |
| Avg. | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |

**UNIT I:** Classification of man-made fibres, definition of regenerated and synthetic fibres, Concepts of molecular weight, methods of determination of MW, Degree of polymerization, Orientation and Crystallinity, Characteristics of fibre forming polymer. Study of some Characterization methods such as birefringence and DSC methods for property evaluation of produced fibres and polymeric materials. Introduction to methods of fibre formation by melt spinning, dry spinning, & wet spinning, important process parameters of spinning systems.

**UNIT II:** Polyethylene terephthalate fibre (PET) – History of development, Fundamentals of Step growth polymerization, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, physical & chemical properties of polyester fibres, applications.

**UNIT III:** Polyamide Fibres – History of development, Different types of polyamide fibres, Nylon polymer production by continuous polymerization in VK Tube, Manufacturing of Nylon 6 fibre by melt spinning, Properties of nylon 6 fibre, Polymer production of Nylon 66, Nylon 66- fibre formation by melt spinning, Physical & chemical properties and applications.

**UNIT IV:** Basic of Free radical polymerization, Polyacrylonitrile fibres, Polyurethane fibres brief manufacturing process by wet and dry spinning, physical and chemical properties of

acrylic fibres & its applications, Properties of polyethylene fibre, Type of polypropylene (PP), Properties of polypropylene fibre. Introduction of high performance fibres.

**UNIT V:** Introduction to solution spinning and regenerated fibre, Raw material for viscose rayon, Manufacturing sequence of viscose fibre, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibres and Lyocell fibres.

**References:**

1. Shakyawar DB and Singh MK,. Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
2. J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
3. R W Moncrieff., Man Made Fibre,5<sup>th</sup> Edition, Publisher Unknown, 1970-
4. R H Peters Textile Chemistry Vol I The Chemistry of Fibres. Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)
5. A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
6. V A Sehna. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
7. Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

**6. BTT451: YARN MANUFACTURE-II LAB (L T P 0 0 2) Credit 1**

1. Study and sketch the working mechanism of draw frame
2. To study of constructional details of draw-frame,
3. To study the roller setting of draw frame drafting system
4. Driving arrangement and calculation of speeds, draft and production of D/F.
5. Processing of Material on Draw frame and evaluating performance.
6. Study of constructional details & Driving arrangement and calculation of speed frame.
7. Study of drafting system of speed frame
8. Study of sliver lap machine and calculation of speeds of different parts and production calculations of sliver lap.
9. Study of sliver lap machine and calculation of speeds of different parts and production calculations of Ribbon lap.
10. Study of sliver lap machine and calculation of speeds of different parts and production calculations of comber.

**7. BTT452: FABRIC MANUFACTURE-II LAB (L T P 0 0 2) Credit 1**

1. General study of shedding mechanism.
2. Study of over pick mechanism
3. Study under pick mechanism
4. Study of 5 wheel & seven wheel take up motion
5. Study of negative let of motion
6. Study of Cam doobby and paper card cutting.
7. Study & working of weft feeler motion.

8. Study & working of auto let-off motion.
9. Study of various doobby mechanics.
10. Study of various jacquard looms.
11. General study of mechanical Jacquard & method of card cutting

#### 8. BTT453: TEXTILE FIBRE-II LAB (L T P 0 0 2) Credit 1

- Principle of microscopy, microscopic identification of man-made fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.
- Identification of Synthetic Fibres, namely Polyester, Nylon, Polypropylene, Acrylic fibres (microscopic views, burning tests and chemical dissolution methods)
- Determination of fineness of fibres by cutting and weighing methods
- Blend Analysis by Chemical means

#### 9: BCC402 Python Programming (L T P 2 0 0) Credit 2

| Course Outcome ( CO) |  | Bloom's Knowledge Level (KL)    |
|----------------------|--|---------------------------------|
| CO1                  | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2                  | Express proficiency in the handling of strings and functions   | K <sub>1</sub> , K <sub>2</sub> |
| CO3                  | Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.   | K <sub>3</sub>                  |
| CO4                  | Identify the commonly used operations involving file systems and regular expressions.  | K <sub>1</sub> , K <sub>2</sub> |
| CO5                  | Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python  | K <sub>2</sub> , K <sub>3</sub> |
| Detailed Syllabus    |  |                                 |
| Unit                 | Topic  | Lecture                         |
| I                    | <b>Introduction to Python:</b> Python variables, Python basic Operators, Understanding pythonblocks. Python Data Types, Declaring and using Numeric data types: int, float etc.  | 03                              |
| II                   | <b>Python Program Flow Control Conditional blocks:</b> if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks.   | 05                              |
| III                  | <b>Python Complex data types:</b> Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python Functions, Organizing python codes using functions. | 04                              |

|   |  |           |
|---|--|-----------|
| IV  | <b>Python File Operations:</b> Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations. | <b>04</b> |
| V   | <b>Python packages:</b> Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tkinter introduction, Tkinter and Python Programming, Tk Widgets, Tkinter examples. Python programming with IDE.                      | <b>04</b> |
| <b>Text books:</b> <ol style="list-style-type: none"> <li>1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education, 2016</li> <li>2. Lambert, Fundamentals of Python: First Programs with MindTap, 2nd 1st Edition, Cengage Learning publication</li> <li>3. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley, 2015</li> <li>4. Jeeva Jose &amp; P.Sojan Lal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Publishers, New Delhi,2016</li> <li>5. Downey, A. et al., “How to think like a Computer Scientist: Learning with Python”, John Wiley, 2015</li> <li>6. Mark Lutz, “Learning Python”, 5th edition, Orelly Publication, 2013, ISBN 978- 1449355739</li> <li>7. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology CengageLearning Publications, 2013, ISBN 978- 1590282410</li> <li>8. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage LearningPublications, 2013, ISBN 978-1435455009</li> <li>9. David Beazley, Brian Jones., “Python Cookbook”, Third Edition, Orelly Publication, 2013, ISBN 978-1449340377</li> </ol> |  |           |

## 10. Sports and Yoga-II: (0 0 3) Non Credit

# **SYLLABUS**

**Uttar Pradesh Textile Technology Institute, Kanpur**

**Affiliated to**

**DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**



**PROPOSED STUDY & EVALUATION SCHEME  
FOR  
2<sup>ND</sup> B. TECH. MAN MADE FIBRE TECHNOLOGYG**

**On**

**AICTE B. Tech Model Curriculum Structure &  
Syllabus**

**(Effective from the Session: 2023-24)**

**Study & Evaluation Scheme**  
**2<sup>nd</sup> Year B. Tech Man Made Fibre Technology**  
**Uttar Pradesh Textile Technology Institute Kanpur**  
**Affiliated to**

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year III-Semester**

**Effective from Session-2023-24**

| Sl. No. | Subject Codes   | Subject                               | Periods   |          |          | Evaluation Scheme |            |            |            | End Semester |            | Total       | Credit    |
|---------|-----------------|---------------------------------------|-----------|----------|----------|-------------------|------------|------------|------------|--------------|------------|-------------|-----------|
|         |                 |                                       | L         | T        | P        | CT                | TA         | Total      | PS         | TE           | PE         |             |           |
| 1       | BOE311          | Polymer Science and Technology        | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 2       | BAS301          | Technical Communication               | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 3       | BTT303          | Textile Fibre-I                       | 2         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 3         |
| 4       | BTT306          | Yarn Technology-I                     | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 5       | BTT307          | Fabric Technology-I                   | 3         | 1        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 4         |
| 6       | BTT353          | Textile Fibre-I Lab                   | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 7       | BTT356          | Yarn Technology-I Lab                 | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 8       | BTT357          | Fabric Technology-I Lab               | 0         | 0        | 2        |                   |            |            | 50         |              | 50         | 100         | 1         |
| 9       | BCC302          | Python Programming                    | 2         | 0        | 0        | 20                | 10         | 30         |            | 70           |            | 100         | 2         |
| 10      | BCC351          | Internship Assessment / Mini Project* | 0         | 0        | 0        |                   | 100        | 100        |            |              |            | 100         | 2         |
| 11      | BVE351 / BVE352 | Sports and Yoga-II/ NSS-II            | 0         | 0        | 3        |                   |            |            | 100        |              |            | 100         | 0*        |
|         |                 | <b>Total</b>                          | <b>15</b> | <b>5</b> | <b>6</b> | <b>120</b>        | <b>160</b> | <b>280</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>1000</b> | <b>25</b> |

**Study & Evaluation Scheme**  
**2<sup>nd</sup> Year B. Tech. Man Made Fibre Technology**  
**Uttar Pradesh Textile Technology Institute Kanpur**  
**Affiliated to**

**DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW**

**2<sup>nd</sup> Year IV-Semester**

**Effective from Session-2023-24**

| Sl. No.   | Subject Codes   | Subject                                       | Periods   |          |          | Evaluation Scheme |           |            |            | End Semester |            |            | Total     | Credit |
|---|-----------------|---|-----------|----------|----------|-------------------|-----------|------------|------------|--------------|------------|------------|-----------|--------|
|   |                 |   | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |        |
|   |                 |   | L         | T        | P        | CT                | TA        | Total      | PS         | TE           | PE         |            |           |        |
| 1   | BAS403          | Math IV                                       | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |        |
| 2   | BVE401          | Universal Human Values & Professional Ethics  | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |        |
| 3   | BTT403          | Textile Fibre-II                              | 2         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 3         |        |
| 4   | BTT406          | Yarn Technology-II                            | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |        |
| 5   | BTT407          | Fabric Technology-II                          | 3         | 1        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 4         |        |
| 6   | BTT453          | Textile Fibre-II Lab                          | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |        |
| 7   | BTT456          | Yarn Technology-II Lab                        | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |        |
| 8   | BTT457          | Fabric Technology-II Lab                      | 0         | 0        | 2        |                   |           |            | 50         |              | 50         | 100        | 1         |        |
| 9   | BCC401          | Cyber Security                                | 2         | 0        | 0        | 20                | 10        | 30         |            | 70           |            | 100        | 2         |        |
| 10  | BVE451 / BVE452 | Sports and Yoga-II/ NSS-II                    | 0         | 0        | 3        |                   |           |            | 100        |              |            | 100        | 0*        |        |
|   |                 | <b>Minor Degree/ Honours Degree MT1/ HT-1</b> |           |          |          |                   |           |            |            |              |            |            |           |        |
|   |                 | <b>Total</b>                                  | <b>15</b> | <b>5</b> | <b>9</b> | <b>120</b>        | <b>60</b> | <b>180</b> | <b>150</b> | <b>420</b>   | <b>150</b> | <b>900</b> | <b>23</b> |        |
| *The Mini Project or internship (4 weeks) will be done during summer break after 4th Semester and will be assessed during V semester. |                 |   |           |          |          |                   |           |            |            |              |            |            |           |        |



## 3<sup>rd</sup> Semester B. Tech. Man Made Fibre Technology

### 1. BOE311: Polymer Science & Technology (SBOE): (L T P 3 1 0) Credit 4

#### *Course Aim*

The aim of this course is to provide students with a comprehensive view of polymer science and technology, including the chemical structure of various polymers, methods of measuring the molecular weight, polymerization kinetics, and polymer processing technologies. The focus is mainly on processing of polymers as well as on the behaviour and technical applications of different polymeric materials.

#### *Course Objectives:*

To provide fundamental and applied knowledge of polymers and their synthesis, manufacturing, processing, characterization and applications of polymers in space, oceans, electronics, agriculture, automobile, sports and building constructions.

**Course Outcomes:** Upon completion of this course, the students will be able to:

| Units CO | Course Outcome  | Bloom's Level |
|----------|---|---------------|
| CO1      | Understand the concept of polymer synthesis, Functionality, Crystallinity, Calculation of average molecular weight, reaction kinetics, physical properties and factors affecting the strength of polymers | K4            |
| CO2      | Understand the properties of polymers, types and mechanism of polymerization  | K3            |
| CO3      | Understand and apply the various processing and manufacturing techniques, high performance polymer  | K3            |
| Co4      | Understand the preparation, properties and technical applications of polymers   | K3            |
| CO5      | Understand the applications of different polymeric materials in current scenario of development   | K3            |

| Unit | Topics  | Lectures/ Hours |
|------|---|-----------------|
| 1    | Introduction, Chemistry of Polymer Synthesis, Classification, Functionality, Tacticity, Crystallinity in Polymers and its Effect on Properties of Polymers, Concepts of Average Molecular Weight in Polymers, Polymer Reaction Kinetics, Physical Properties, Factors Affecting Strength. | 8               |
| 2    | Effect of Structure on Properties of Polymers, Organic Polymers, Step Growth and Chain Growth Polymerization and its Mechanism, Coordination, Polymerization, Copolymerization  | 8               |
| 3    | Polymer Processing, Injection, Moulding, Blow Moulding, Compression Moulding, Introduction to High Performance Polymers and Polymer Composites.   | 8               |
| 4    | , Properties and Technical Applications of Thermoplastic (PVC, PVA, PTEE), Thermostats (PF, UF, MF) and Elastomers (SBR, Nitril Rubber, Butyl Rubber, Polychloroprene), Vulcanization of Rubber and its advantages, Biopolymers and Degradation of Polymers                               | 8               |
| 5    | Epoxy Resins, Silicones, Application of Polymer in Space, Ocean, Electronics Medical, Agriculture, Automobile, Sports and Building Construction   | 8               |

#### *Text Books:*

1. Polymer Science, Wiley & Sons, 3<sup>rd</sup> Edition, By Billmeyer, F.W. Jr. ISBN: 978-8126511105 (2007).
2. Fundamentals of Polymers, McGraw Hill By Kumar, A., Gupta, R. K. ISBN: 0-8247-0867-9 (2003).

3. Polymer Science and Technology, 3<sup>rd</sup> Edition, Prentice Hall By Joel R Fried, ISBN: 978-0-13-703955-5, (2014).
4. Polymer Science and Technology, 1<sup>st</sup> Edition, CRC Press Inc By Robert O Ebewe, ISBN: 978-0849389399 (2000).
5. Polymer Science and Technology, 3<sup>rd</sup> Edition, McGraw Hill Education (India) Private Limited, By Ghosh Premamoy, ISBN: 978-0070707047 (2011).

**Reference Books:**

1. Principles of Polymer Processing, 2<sup>nd</sup> Edition, Wiley Interscience, Tadmo, Z; Gogos, C.G., ISBN: 0-471-38770-3 (2006).
2. Polymer Science and Engineering, Prentice Hall of India, Williams, D. J., ISBN: 978-0136856368 (1971).
3. Handbook of Polymer Science and Technology, 1<sup>st</sup> Volume, 1<sup>st</sup> Edition, CBS Publication By Ferry MH, ISBN: 978-8123911328 (2012)

**2 BAS301: TECHNICAL COMMUNICATION (L T P 2 1 0) Credit 3**

**Course Objectives**

1. Explain the nature and objective of Technical Communication relevant for the work place as Engineers.
2. Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
3. Enhance confidence in face of diverse audience.
4. Create a vast know-how of the application of the learning to promote their technical competence.
5. Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 2    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 3    |     |     |     |     |     |     |     |     |     | 3    |      | 1    |
| 4    |     |     |     |     |     |     |     |     |     | 3    |      | 2    |
| 5    |     |     |     |     |     |     |     |     |     | 2    |      | 2    |
| Avg. |     |     |     |     |     |     |     |     |     | 3    |      |      |

**Unit 1 : Fundamentals of Communication and Voice Dynamics:**

Role and Purpose of Communication, Types & Flow of Communication, Barriers to Effective Communication,  
 7 C's of Communication, Code and Content; Stimulus & Response, Vowel Sounds, Consonant Sounds, Tone: Rising and Falling Tone.

**Unit 2 : Communication Skills for Career Building**

CV and Résumé Writing, Interview Skills, Group Discussion, Effective Profiling, Communication and Networking: Building relationships, Writing the Statement of Purpose (SOP) for admission in Higher Studies, Seminar & Conference Paper Writing, Expert Technical Lecture: Writing and Presenting.

**Unit 3: Communication Skills for Presentation: Writing, Designing, and Speaking**

Thesis and Project Report Writing, Technical Proposal Writing, how to Pitch an Idea: Process, Preparation and Structure, Elements of Speech Delivery: Passion, Poise & Illustrations.

**Unit 4 : Communication and Leadership Development**

Leadership Communication, Communication and Social competence: context, feelings, intentions, behaviours, Providing and Receiving feedback, Difference between Tact and Intelligence, Emotional Intelligence: Trust through Communication, Thinking Skills: Meaning and Types.

**Unit 5 : Digital Communication and Personality Making**

Content Creation for Social Media: Emails, Webinars, podcasts, Blogs. Effective and Ethical use of Social Media by Text and Technique, Speech and Personality, Personality Analysis: Types of

Personality; Concept of Personality: Maslow, Freud, Vivekananda, Jung Typology & Personality Assessment.

### Prescribed Books:

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2018, New Delhi
2. Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
3. Technical Communication, by Pfeiffer, 6<sup>th</sup> edn (Pearson)
4. Soft Skills & Employability, Sabina Pillai and Agna Fernandez Cambridge University Press 2018.
5. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S.Publications India Ltd.; Krishan Nagar, 2014, Delhi.

### Web link/ free resources for reference:

- <https://online.hbs.edu/blog/post/leadership-communication>
- <https://blog.hubspot.com/marketing/content-creation>
- <https://vincenttriola.com/blogs/ten-years-of-academic-writing/sigmund-freud-carl-jung-carl-rogers-abraham-maslow>
- <https://www.verywellmind.com/jungs-theory-of-personality-learning-styles-2795160>
- <https://www.humanmetrics.com/personality>
- <https://hbr.org/2022/11/how-great-leaders-communicate>

### 3. BTT303: TEXTILE FIBRE-I (L T P 2 1 0) Credit 3

**Course Outcome:** After completing the course student will be able to:

- CO1 Generate a general idea about Natural fibres and their classification. Define and explain textile fibre properties in general, able to give fundamentals of major characterization techniques of textile fibres and polymers, explain fibre yarn and fabric property relationships, explain essential and desirable properties
- CO2 Describe their origin of and agricultural methods of production of fibres, compare properties of these fibres. Explain Polymer systems, morphological and analyse fine structure, explain basics XRD results, electron microscopes, describe chemical components and relevant reactions, importance in processing, explain application in relation to properties of fibres..
- CO3 Classify natural protein fibres (wool and Silk) in detail by various means, by geographical origin and genetic, explain Growth of wool and basic sericulture. Describe morphological structure, polymer system of wool and silk, & their characterization.
- CO4 State, understand and explain general properties of Wool fibres (Physical and chemical), relate fibre properties with application. Compare Wool and silk and other fibres in terms of application and properties.
- CO5 State and explain general properties of Silk fibres (Physical and chemical), correlate them with application. Describe modification of wool and silk fibres.

### Course Articulation Matrix of Textile Fibre-I:

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1  | 3   | 3   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 2  | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      | 1    |
| 3  | 3   | 2   | 2   | 3   | 3   |     |     |     |     |      |      | 1    |
| 4  | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 5  | 3   | 3   | 2   | 3   | 2   | 2   | 2   |     |     |      |      |      |

|      |   |   |   |   |   |   |   |  |  |  |  |   |
|------|---|---|---|---|---|---|---|--|--|--|--|---|
| Avg. | 3 | 3 | 3 | 3 | 3 | 2 | 2 |  |  |  |  | 1 |
|------|---|---|---|---|---|---|---|--|--|--|--|---|

**UNIT I:** Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man-made fibres. General Testing Methods and Characterization techniques, general properties of fibres. Moisture relations in textiles.

**UNIT II:** Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

**UNIT III:** Flax/Jute/Ramie cultivation, retting and extraction process, grading, Fibre structure of jute and flax, chemical compositions, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like hemp, banana, bamboo fibre etc.

**UNIT IV:** Types of wool and its grading, Classification and Origin, Morphological structure (bilateral, scaly structure, ortho and paracortex), chemical (protein) composition, effect on properties, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc.

**UNIT V:** Types of silk and its production, chemical composition, polymer systems, molecular and morphological structure of silk, physical & chemical properties of silk and its applications.

**References:**

- Shakyawar DB and Singh MK,. Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
- J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
- R W Moncrieff., Man Made Fibre, 5<sup>th</sup> Edition, Publisher Unknown, 1970-
- R H Peters Textile Chemistry Vol I The Chemistry of Fibres . Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)
- A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
- V A Sehna. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
- Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

**4. BTT306: YARN TTECHNOLOGY-I (L T P 3 1 0) Credit 4**

| Sr. No. | Course Code | Course | Semester | Year |
|---------|-------------|--------|----------|------|
|---------|-------------|--------|----------|------|

|    |                |                          |     |                              |
|----|----------------|--------------------------|-----|------------------------------|
| 03 | <b>BTT-306</b> | <b>Yarn Technology-I</b> | III | 2 <sup>nd</sup> . Y. B. Tech |
|----|----------------|--------------------------|-----|------------------------------|

|     |   |
|-----|---|
| CO1 | Explain the importance of ginning & select ginning machine for different types of cotton.                             |
| CO2 | Explain the principles involved in opening & cleaning machines in blow room.  |
| CO3 | Analyse different types of blow room & carding process defects and evaluate quality parameters in blow room and card. |
| CO4 | Explain the principle & different drafting systems of draw frame  |
| CO5 | Explain working of draw frame & calculation related to draw frame   |

**Course Articulation Matrix of Yarn Manufacture-I :**

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BTT-301.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BTT-301.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BTT-301.4 | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 3    |
| BTT-301.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**Unit(1):** Picking and cotton harvesting. Ginning, pre-cleaning of cotton. Pre and post ginning. Description and working of knife roller, Mecarthy and saw gins, kinds of mixing, Principles of selection of cotton for mixing hand, bin, stack mixing, auto mixer, different cotton varieties, advantages and disadvantages of mixing.

**Total lectures required =08**

**Unit (2):** Object of blow room. Types of openers, beaters, Lap forming mechanism. Lap rejection and lap defects. Production and efficiency of different m/c. Chute feed system, latest openers and beaters.

**Total lectures required =08**

**Unit (3):** Objects, feeding, carding and doffing of material. Specification of different parts of card & card clothing, Types of card clothing, card setting, stripping grinding, assessment of neps, basic card calculation, autolevelers in card.

**Total lectures required =08**

**Unit(4):** Objects of draw frame, different drafting systems, roller slip and drafting waves, roller weighting, various stop motion, different weighting systems.

**Total lectures required =08**

**Unit(5):** Working of draw frame, drafting and its types, Concept of high speed draw frame., calculation on draft and production.

**Total lectures required =08**

**References:**

- W.Klein. The Textile Institute Publication – Manual of Textile Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993
- P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths,

London 1975

- E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
- C Shringley, 'Opening and Cleaning' Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
- I Doraiswamy. 'Cotton Ginning', Textile Progress, Textile Institute Publication. 1993
- R Chattopadhyay, Blow-room and Carding- Training Programme conducted by NCUTE, IIT, Delhi. 1999

## 5. BTT307-FABRIC TECHNOLOGY-I ( L T P 3 1 0) Credit 4

**Course Outcome:** After completing the course student will be able to:

- CO1 Explain and explain the objectives of winding, warping & Sizing
- CO2 Be able to explain the principles of winding, sectional warping, beam warping
- CO3 Able to calculate the production of winding, warping & sizing machines & material balance
- CO4 Able to explain the concepts of stop motions, cutters, control systems in different machine
- CO5 Decide the size recipe for different types of fibres and yarn, developments in sizing machines

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 2   | 3   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |
| 2    | 3   | 2   | 3   | 3   | 3   |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 3   | 2   |     |     |     |     |      |      | 2    |
| 4    | 3   | 3   | 2   | 2   | 3   |     |     |     |     |      |      | 1    |
| 5    | 2   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |
| Avg. | 3   | 2   | 2   | 3   | 2   |     |     |     |     |      |      | 2    |

**UNIT I:** Objects of winding process, classification of winding, (manual & automatic), various latest winding machines with detailed construction and working, Description of various winding accessories.

**UNIT II:** Drum and spindle driven winding= mechanism, motions of wound and supply packages, package building mechanism, digi-cone winder, winding package faults & their prevention, Geometrical aspects: - Cone angle, coil angle, wind ratio, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, calculations: winding speed, production/spindle & per machine, and efficiency.

**UNIT III:** Objectives of pirn winding, its advantage over rewound weft, Pirn build: - length of wind, chase length, diameter, bunch, tail ends etc. their importance during weaving process. Yarn tensioning- types and their mechanism. Winding and unwinding tension variation, Yarn clearing-principle and measurement. Yarn imperfections, faults and splicing. Classimat representation

**UNIT IV:** Objectives of warping, precautions to be considered in the process, classification of warping process- (beam warping, sectional warping, ball warping), Latest Warping machine: - construction and working, Creel: - framing (requirements, length, height, pitch, etc.) pegs, tensioning arrangements guides, blow fan, types of creels (parallel, V, V-nose etc.), Waxing attachment, computerized warping machines. Warping efficiency with different creels.

**UNIT V:** Objectives of sizing and sizing terminology, achieving the objectives through sizing paste constituents, concepts of sizing process: pre-wetting, sizing, splitting and drying, hank sizing, ball warp sizing, cold sizing , hot-melt sizing,Slasher sizing, multi- cylinder sizing, description of sizing ingredients and factors affecting sizing efficiency, Latest developments in sizing process by various sizing machine manufacturers.

**References:**

- M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
- R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
- M K Talukdar, P K Sriramalu, D B Ajgaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
- K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
- R Sengupta. **Yarn Preparation-Vol.-I and Vol-II**. University of Mishigan, Popular Prakashan, 1963
- J.E. Booth Textile Mathematics-Vol. I, II &III Published by The Textile Institute Manchester, 1975
- B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc.,US; 6th edition (1 March 1983)
- P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

**6. BTT353: TEXTILE FIBRE-I Lab (0 0 2) Credit 1**

Principle of microscopy, microscopic identification of natural fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.

- Identification of Natural Fibres, namely Cotton, Wool, Silk, Jute
- Determination of fineness of fibres
- Blend Analysis by chemical means

**7. BTT356: YARN TECHNOLOGY-I LAB (0 0 2) Credit 1**

1. To determine trash content% and analysis of waste by using trash analyzer
2. To study and sketch general outline of opener, cleaner and mix/ blender in blow room
3. To study feed regulating mechanism in blow room
4. To study different setting point on blow room
5. To determine cleaning efficiency of blow line
6. To study and sketch the working mechanism of various operations of a card
7. To study different settings of the card
8. To study gearing plan and calculate draft constant and production constant of card
9. To study nep removal efficiency of card
10. To study various types of waste in card and its analysis

**8. BTT357: FABRIC TECHNOLOGY-I LAB (0 0 2) credit 1**

1. Study of weaving preparatory and weaving processes
2. Study of loom drive, loom timing, passage of material and primary motions.
3. Study of precision winding machine
4. Study of drum winding machine.
5. Study of cheese winding machine.
6. Study of various types of yarn tensioners used in winding
7. Study of autoconer and its functions
8. Study of pirn winding machine
9. Study of sectional warping machine
10. Study of beam warping machine

**9. BCC 302 : Python programming (2 0 0) Credit 2**

| Course Outcome ( CO)     |  | Bloom's Knowledge Level (KL)    |
|--------------------------|--|---------------------------------|
| CO1                      | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.  | K <sub>1</sub> , K <sub>2</sub> |
| CO2                      | Express proficiency in the handling of strings and functions   | K <sub>1</sub> , K <sub>2</sub> |
| CO3                      | Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.   | K <sub>3</sub>                  |
| CO4                      | Identify the commonly used operations involving file systems and regular expressions.  | K <sub>1</sub> , K <sub>2</sub> |
| CO5                      | Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python  | K <sub>2</sub> , K <sub>3</sub> |
| <b>Detailed Syllabus</b> |  |                                 |
| Unit                     | Topic  | Lecture                         |
| I                        | <b>Introduction to Python:</b> Python variables, Python basic Operators, Understanding python blocks. Python Data Types, Declaring and using Numeric data types: int, float etc.   | 03                              |
| II                       | <b>Python Program Flow Control Conditional blocks:</b> if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks. | 05                              |



|  |   |           |
|--|---|-----------|
| III  | <b>Python Complex data types:</b> Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. PythonFunctions, Organizing python codes using functions. | <b>04</b> |
| IV   | <b>Python File Operations:</b> Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations.  | <b>04</b> |
| V  | <b>Python packages:</b> Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tkinter introduction, Tkinter and PythonProgramming, Tk Widgets, Tkinter examples. Python programming with IDE.  | <b>04</b> |
| <p><b>Text books:</b></p> <ol style="list-style-type: none"> <li>1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016</li> <li>2. Lambert, Fundamentals of Python: First Programs with MindTap, 2nd 1st Edition , Cengage Learning publication</li> <li>3. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley, 2015</li> <li>4. Jeeva Jose &amp;P.SojanLal, “Introduction to Computing and Problem Solving with PYTHON”, Khanna Publishers, New Delhi,2016</li> <li>5. Downey, A. et al., “How to think like a Computer Scientist: Learning with Python”, John Wiley, 2015</li> <li>6. Mark Lutz, “Learning Python”, 5th edition, Orelly Publication, 2013, ISBN 978- 1449355739</li> <li>7. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology CengageLearning Publications, 2013, ISBN 978- 1590282410</li> <li>8. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage LearningPublications, 2013, ISBN 978-1435455009</li> <li>9. David Beazley, Brian Jones., “Python Cookbook”, Third Edition, Orelly Publication, 2013, ISBN 978-1449340377</li> </ol> |   |           |

## 10. BCC351 : Internship Assessment / Mini Project Credit 2

## 4<sup>th</sup> Semester B. Tech. Man Made Fibre Technology

### 1. BAS 403: Mathematics-IV Probability & Statistics (L T P 3 1 0) Credit 4

Pre- requisites (if any): Knowledge of Mathematics I and II of B. Tech or equivalent

#### Course Outcomes

The objective of this course is to familiarize the students with partial differential equation, their application and statistical techniques. It aims to present the students with standard concepts and tools at an intermediate to superior level that will provide them well towards undertaking a variety of problems in the discipline.

The students will learn:

- The idea of partial differential equation and its different types of solution.
- The concept of method of separation of variables and Fourier transform to solve partial differential equations.
- The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
- The idea of probability, random variables, discrete and continuous probability distributions and their properties.
- The statistical methods of studying data samples, hypothesis testing and statistical quality control.

#### Course Articulation Matrix of Mathematics-IV.

| CO        | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BAS-303.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BAS-303.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BAS-303.4 | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| BAS-303.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.      | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

#### **Module I: Partial Differential Equations**

**8**

Origin of Partial Differential Equations, Linear and Non-Linear Partial Differential Equations of first order, Lagrange's Equations method to solve Linear Partial Differential Equations, harpit's method to solve Non-Linear Partial Differential Equations, Solution of Linear Partial differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

#### **Module II: Applications of Partial Differential Equations and Fourier Transform**

**8**

Method of separation of variables, Solution of one dimensional heat equation, wave equation, Two dimensional heat equation (only Laplace Equation) and their application, Complex Fourier transform, Fourier sine transform, Fourier cosine transform, Inverse transform, convolution theorem, Application of Fourier Transform to solve partial differential equation.

#### **Module III: Statistical Techniques I**

**8**

Overview of Measures of central tendency, Moments, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Fitting of second degree parabola, Exponential curves, Correlation and Rank correlation, Regression Analysis: Regression lines of y on x and x on y.

**Module IV: Statistical Techniques II****8**

Overview of Probability Random variables (Discrete and Continuous Random variable) Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poisson and Normal distributions.

**Module V: Statistical Techniques III****8**

Introduction of Sampling Theory, Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, t-test, Z-test and Chi-square test, Statistical Quality Control (SQC), Control Charts, Control Charts for variables (X and R Charts), Control Charts for Variables (p, np and C charts).

**Text Book:**

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 44<sup>th</sup> Edition, Khanna Publishers, New Delhi.

**Reference Book:**

1. Peter V. O'Neil, "Advance Engineering Mathematics", SI Edition 8<sup>th</sup> Edition, Cengage Learning, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publishing Company Ltd., 2017.
3. S. S. Sastry, "Introductory methods of Numerical solutions", 4th Edition, Prentice Hall of India.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley Publications, 1999.
5. R.K. Jain & S.R.K. Iyengar, "Numerical Methods", New Age International (P) Limited
6. James F. Epperson Mathematical Reviews "An Introduction To Numerical Methods And Analysis" Second Edition, Wiley;  
<https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf>

**Reference Books**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.
2. T. Veerarajan : Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi.
3. R.K. Jain and S.R.K. Iyengar: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
4. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.
5. D.N. Elhance, V. Elhance & B.M. Aggarwal: Fundamentals of Statistics; Kitab Mahal Distributers, New Delhi.

**2. BVE 401 : Universal Human Values & Professional ethics (L T P 2 1 0) credits Objectives:**

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content, and process of value education.
2. To help students initiate a process of dialog within themselves to know what they really want to be in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

**Course Outcome:**

On completion of this course, the students will be able to

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content, and process of value education, explore the meaning of happiness and prosperity, and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, and understand the meaning of Harmony in the Self and the Co-existence of Self and Body.
3. Understand the value of harmonious relationships based on trust, respect, and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and workout their mutually fulfilling participation in nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

**Catalogue Description:**

Every human being has two sets of questions to answer for his life: a) what to do? And, b) how to do?. The first set pertains to the value domain, and the other to the skill domain. Both are complimentary, but value domain has a higher priority. Today, education has become more and more skill biased, and hence, the basic aspiration of a human being, that is to live with happiness and prosperity, gets defeated, in spite of abundant technological progress. This course is aimed at giving inputs that will help to ensure the right understanding and right feelings in the students in their life and profession, enabling them to lead an ethical life. In this course, the students learn the process of self- exploration, the difference between the Self and the Body, the naturally acceptable feelings in relationships in a family, the comprehensive human goal in the society, the mutual fulfillment in the nature and the co- existence in existence. As a natural outcome of such inputs, they are able to evaluate an ethical life and professional ahead.

| CO           | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| BVE301/401.1 | 2   | 3   | 3   | 3   | 2   |     |     |     |     |      |      | 3    |
| BVE301/401.2 | 3   | 2   | 2   | 2   | 1   |     |     |     |     |      |      | 2    |
| BVE301/401.3 | 3   | 3   | 2   | 3   | 1   |     |     |     |     |      |      | 1    |
| BVE301/401.4 | 3   | 3   | 2   | 1   | 2   |     |     |     |     |      |      | 3    |
| BVE301/401.5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| Avg.         | 3   | 3   | 2   | 2   | 2   |     |     |     |     |      |      | 2    |

**Unit 1:**

**Course Introduction-** Need, Basic Guidelines, Content, and Process for Value Education Understanding the need, basic guidelines, content, and process for Value Education, Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation –as the mechanism for self-exploration, Continuous

Happiness, and Prosperity-A look at basic Human Aspirations, Right understanding, Relationship, and Physical Facilities-the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels..

### **Unit2: Understanding Harmony in the Human Being – Harmony in Myself**

Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ – Sukh and Suvidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity indetail, program to ensure Sanyam and Swasthya.

### **Unit 3: Understanding Harmony in the Family and Society- Harmony in human-Human Relationship**

Understanding harmony in the Family- the basic unit of human interaction , Understanding values in human-human relationship; meaning of *Nyaya*and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva*as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*Sarvabhaum Vyawastha*)-from family to world family!.

### **Unit 4: Understanding Harmony in the Nature and Existence – Whole existence as Co-existence**

Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

### **Unit 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics**

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identifythescopeandcharacteristicsofpeople-friendlyandeco-friendlyproduction systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) At the level of society: as mutually enriching institutions and organizations.

#### **Text Books:**

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course 16lats16n Values and Professional Ethics.

#### **Reference Books:**

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972,

Limits to Growth – Club of Rome’s report, Universe Books.

5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
7. A N Tripathy, 2003, Human Values, New Age International Publishers.
8. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
9. E G Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford UniversityPress
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co.,Lucknow. Reprinted2008.

**Mode of Evaluation:** Assignment / Project / Seminar / Continuous Assessment Test / Semester End Exam

### 3. BTT403: TEXTILE FIBRE-II (L T P 2 1 0) Credits 3

**Course Outcome:** After completing the course student will be able to:

- CO1 Generate a general idea about synthetic fibres and their classification. Learning about general principles of fibre manufacturing. Conceptualize properties of fibre forming polymers, polymerization fundamentals, structure property relationships and changes during processing.
- CO2 Learn and understand about raw material requirements, polymerization and spinning technologies of different important synthetic fibres, e.g. Nylons, PET, PE, PP, Rayon, Acrylic.
- CO3 Know about physical, chemical and other functional properties of the commercial fibres and carry out fundamental calculations related to synthetic fibre production.
- CO4 Analyze factors affecting different physical and chemical properties of the fibres.
- CO5 Develop idea of fibres for diversified applications for specific end use and requirements. Correlate fibre properties with end uses.

#### Course Articulation Matrix of Textile Fibre-II:

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 1   | 2   |     |     |     | 2   |     |     |      |      |      |
| 2    | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |
| 3    | 2   | 3   | 1   | 3   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 3   |     |     |     |     |     |     |      |      |      |
| 5    | 3   | 1   | 1   |     |     |     | 2   |     |     |      |      | 1    |
| Avg. | 3   | 3   | 2   | 3   | 2   | 1   | 2   |     |     |      |      | 1    |

**UNIT I:** Classification of man-made fibres, definition of regenerated and synthetic fibres, Concepts of molecular weight, methods of determination of MW, Degree of polymerization, Orientation and Crystallinity, Characteristics of fibre forming polymer. Study of some Characterization methods such as birefringence and DSC methods for property evaluation of produced fibres and polymeric materials. Introduction to methods of fibre formation by melt spinning, dry spinning, & wet spinning, important process parameters of spinning systems.

**UNIT II:** Polyethylene terephthalate fibre (PET) – History of development, Fundamentals of Step

growth polymerization, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, physical & chemical properties of polyester fibres, applications.

**UNIT III:** Polyamide Fibres – History of development, Different types of polyamide fibres, Nylon polymer production by continuous polymerization in VK Tube, Manufacturing of Nylon 6 fibre by melt spinning, Properties of nylon 6 fibre, Polymer production of Nylon 66, Nylon 66- fibre formation by melt spinning, Physical & chemical properties and applications.

**UNIT IV:** Basic of Free radical polymerization, Polyacrylonitrile fibres, Polyurethane fibres brief manufacturing process by wet and dry spinning, physical and chemical properties of acrylic fibres & its applications, Properties of polyethylene fibre, Type of polypropylene (PP), Properties of polypropylene fibre. Introduction of high performance fibres.

**UNIT V:** Introduction to solution spinning and regenerated fibre, Raw material for viscose rayon, Manufacturing sequence of viscose fibre, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibres and Lyocell fibres.

**References:**

1. Shakyawar DB and Singh MK,. Vstra Reshe, Utpadan, Visheshtayen aivam Upyog. Abhishek Publication. Chandigarh, 2021
2. J. Gordon Cook, Hand book of Textile Fibres (Natural Fibres) (Part I) Elsevier Publications, New York 1984 Sara J. Kadolh Textiles, Publisher: Pearson; 12th edition (31 May 2016)
3. R W Moncrieff., Man Made Fibre, 5<sup>th</sup> Edition, Publisher Unknown, 1970-
4. R H Peters Textile Chemistry Vol I The Chemistry of Fibres . Elsevier Publishing Company; 1St Edition (January 1, 1963) (1 January 1963)
5. A R Russel Handbook of Properties of Textile and Technical Fibres, Woodhead Publishing; 2nd edition (4 January 2018)
6. V A Sehna. Textile Fibres. Volume 1 of Technology of textile processing. Sevak Publications, 1971
7. Singh MK, Singh A, Characterization of Polymers and Fibres. Elsevier Publications. NewYork. 2021

**4. BTT406: YARN TECHNOLOGY-II ( L T P 3 1 0) Credits 4**

**Course Outcome:** After completing the course student will be able to:

|     |   |
|-----|---|
| CO1 | Identify the importance of preparatory process for combing, the parameters in preparatory process for combing & its influence on combing  |
| CO2 | Elaborate the concept & mechanism involved in combing & demonstrate different comber setting for different types of combing   |
| CO3 | Explain the role of roving process, concept of twisting & winding, building mechanism & able to calculate draft, twist, production & other parameters related to D/F, comber & roving frame |
| CO4 | Explain objectives & principles involved in ring spinning   |
| CO5 | Explain yarn faults & calculation of ring spinning.   |

**Course Articulation Matrix of Yarn Manufacture-II:**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1  | 2   | 3   | 3   | 3   | 1   |     |     |     |     |      |      | 3    |
| 2  | 3   | 3   | 3   | 2   | 2   |     |     |     |     |      |      | 2    |

|      |   |   |   |   |   |  |  |  |  |  |  |   |
|------|---|---|---|---|---|--|--|--|--|--|--|---|
| 3    | 3 | 3 | 2 | 3 | 1 |  |  |  |  |  |  | 3 |
| 4    | 3 | 3 | 3 | 1 | 2 |  |  |  |  |  |  | 2 |
| 5    | 3 | 2 | 3 | 3 | 3 |  |  |  |  |  |  | 2 |
| Avg. | 3 | 3 | 3 | 2 | 2 |  |  |  |  |  |  | 2 |

**Unit1:** Objectives of combing, system of lap preparation, sliver lap, ribbon lap and super lap machines, configuration of fibre feed and its effect on the quality of product and efficiency of comber ,combing cycle.

**Total lectures required=08**

**Unit2:**Important parts of comber and their functioning, Combing cycle, concept of forward and backward feed, concept of comber waste, calculation pertaining to production and noil percentage.

**Total lectures required=08**

**Unit 3:** Objectives of speed frame, important parts of speed frame and their functioning, Mechanism involved in drafting, twisting, and winding, different types of roller drafting systems, Common defects in roving package, calculations pertaining to gearing, draft, t.p.i. and production, twist multiplier and roving twist

**Total lectures required=08**

**Unit 4:** Introduction and objective of ring frame, important parts of ring frame and their functions, principle and mechanism involved in drafting, twisting and winding, Types of rings and travellers, mechanism of cop formation, common package size,

**Total lectures required=08**

**Unit5:** Control in yarn faults, ring frame calculations pertaining to TPI, production and draft, Doubling - Objects and terminology, study of ring doublers, Reeling: Objects and terminology, types of reeling construction and working of a reel, yarn bundling,

**Total lectures required=08**

#### **References:**

1. W.Klein. The Textile Institute Publication – Manual of Textile Engineering – Short Staple Spinning Published by Textile Institute, Manchester England 1993
2. P Lord. The Characteristics of Raw Cotton’ The Textile Institute Publication, Butterworths, London 1975
3. E Lord., Manual of Cotton Spinning Vol. II, Part-I. The Textile Institute Butterworths, London, 1966
4. C Shringley, Opening and Cleaning’ Published The Textile Institute Manchester, Manual of Cotton Spinning, Vol. II, Part-II. 1973
5. I Doraiswamy. ‘Cotton Ginning’, Textile Progress, Textile Institute Publication. 1993
6. R Chattopadhyay, Blow-room and Carding- Training Programme conducted by NCUTE, IIT, Delhi. 1999

#### **5. BTT407: FABRIC TECHNOLOGY-II (L T P 3 1 0) Credits 4**

**Course Outcome:** After completing the course student will be able to:

- CO1 Explain objectives of drawing-in, limitations of knotting
- CO2 Explain& able to explain primary & secondary motions involved in loom, different methods of shedding & picking, different types of let-off & take-up mechanism
- CO3 Explain& explain tappet, Dobby & jacquard loom s & their uses & mechanism involved in



- it.
- CO4 Explain mechanism involved in terry, working of drop box loom, pick at will loom, various stop motions involved in loom

**Course Articulation Matrix of Fabric Manufacture-II:**

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1    | 3   | 3   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 2    | 3   | 3   | 3   | 2   |     |     |     |     |     |      |      | 1    |
| 3    | 3   | 2   | 3   | 1   |     |     |     |     |     |      |      | 1    |
| 4    | 3   | 3   | 2   | 1   |     |     |     |     |     |      |      | 2    |
| 5    | 2   | 3   | 3   | 2   | 1   |     |     |     |     |      |      | 1    |
| Avg. | 3   | 3   | 3   | 1   | 1   |     |     |     |     |      |      | 1    |

**UNIT I:** Drawing-in: Objectives, process description, reed count system, manual drawing-in, semi-automatic drawing-in process, Knotting process and its limitations. Various methods of fabric manufacture and automatic weaving: - Weaving, knitting, braiding, non-woven, brief description of all methods and processes involved in it,

**UNIT II:** Different kinds of fabrics: Grey, mono-colour, multi-colour, warp or weft stripes, checks etc., General description of plain power looms, introduction to weaving process, primary, secondary and auxiliary motion of plain power looms, Various ways of shedding, over and under pick motion, tappet shedding,

**UNIT III:** Temples and its utility, idea about healds count and reed count in different system, Negative and positive take up motion, five wheel and seven wheel take up motion and positive let-off motions, Calculations: -Production and efficiency of machine.

Unit IV: Scope & limitation of dobby, negative and positive dobby, cross border dobby, Development in dobby, Scope and limitations dobby, brief description of Crompton and Knowles dobby, cross border dobby, method of pegging for dobby, methods of pegging, heald reversing motion. Warp protective devices, side and center weft fork motion.

**UNIT V:** Jacquards shedding, types of jacquards and their principle of working, size and figuring capacity of jacquard, cross border jacquards. Single lift single cylinder Jacquard, Double lift single cylinder, Double lift double cylinder, split harness, Different system of harness tie- up, terry mechanism, Recent developments in jacquardweaving.

**References:**

1. M.K. Singh. Industrial Practices in Weaving Preparatory, Woodhead Publication. 2014
2. R Marks, ATC Robinson. **Principles of Weaving**, Published by The Textile Institute Manchester, 1986
3. M K Talukdar, P K Sriramalu, D B Ajaonkar. **Weaving: Machines, Mechanisms and Management**, Published by Mahajan Publisher Ahmedabad, India 1994
4. K.T.Aswani. **Fancy Weaving Mechanism** Published by Mahajan Publisher Ahmedabad, India 1994
5. R Sengupta. **Yarn Preparation-Vol.-I and Vol-II**. University of Mishigan, Popular Prakashan, 1963
6. J.E. Booth Textile Mathematics-Vol. I, II &III Published by The Textile Institute Manchester, 1975
7. B P Corbman, **Textile: Fibre to Fabric** McGraw-Hill Inc.,US; 6th edition (1 March 1983)
8. P K Banerjee, **Principles of Fabric Formation**. CRC Press Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL, 2015

**6. BTT453: TEXTILE FIBRE-II LAB (L T P 0 0 2) Credit 1**

- Principle of microscopy, microscopic identification of man-made fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical

analysis.

- Identification of Synthetic Fibres, namely Polyester, Nylon, Polypropylene, Acrylic fibres (microscopic views, burning tests and chemical dissolution methods)
- Determination of fineness of fibres by cutting and weighing methods
- Blend Analysis by Chemical means

**7. BTT456: YARN TECHNOLOGY-II LAB (L T P 0 0 2) Credit 1**

1. Study and sketch the working mechanism of draw frame
2. To study of constructional details of draw-frame,
3. To study the roller setting of draw frame drafting system
4. Driving arrangement and calculation of speeds, draft and production of D/F.
5. Processing of Material on Draw frame and evaluating performance.
6. Study of constructional details & Driving arrangement and calculation of speed frame.
7. Study of drafting system of speed frame
8. Study of sliver lap machine and calculation of speeds of different parts and production calculations of sliver lap.
9. Study of sliver lap machine and calculation of speeds of different parts and production calculations of Ribbon lap.
10. Study of sliver lap machine and calculation of speeds of different parts and production calculations of comber.

**8. BTT457: FABRIC TECHNOLOGY-II LAB (L T P 0 0 2) Credit 1**

1. General study of shedding mechanism.
2. Study of over pick mechanism
3. Study under pick mechanism
4. Study of 5 wheel & seven wheel take up motion
5. Study of negative let of motion
6. Study of Cam dobbie and paper card cutting.
7. Study & working of weft feeler motion.
8. Study & working of auto let-off motion.
9. Study of various dobbie mechanics.
10. Study of various jacquard looms.
11. General study of mechanical Jacquard & method of card cutting

**9. BCC401 Cyber Security (2 0 0) Credit 2**

| Course Outcome (CO) |  | Bloom's Knowledge Level (KL)    |
|---------------------|--|---------------------------------|
| CO1                 | Understand the basic concepts of cyber security and cybercrimes. | K <sub>1</sub> , K <sub>2</sub> |
| CO2                 | Understand the security policies and cyber laws.                 | K <sub>1</sub> , K <sub>2</sub> |
| CO3                 | Understand the tools and methods used in cyber crime             | K <sub>2</sub>                  |
| CO4                 | Understand the concepts of cyber forensics                       | K <sub>1</sub> , K <sub>2</sub> |
| CO5                 | Understand the cyber security policies and cyber laws            | K <sub>2</sub>                  |

| Detailed Syllabus   |   |         |
|---|---|---------|
| Unit  | Topic   | Lecture |
|   | <b>INTRODUCTION TO CYBER CRIME :</b> Cybercrime- Definition and Origins of the word Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyber offenses: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector.  | 04      |
|   | <b>CYBER CRIME :</b> Mobile and Wireless Devices-Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era. | 04      |
|   | <b>TOOLS AND METHODS USED IN CYBER CRIME :</b> Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan-horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction to Phishing, Identity Theft (ID Theft).  | 04      |
|   | <b>UNDERSTANDING COMPUTER FORENSICS:</b> Introduction, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation. Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics   | 04      |
|   | <b>INTRODUCTION TO SECURITY POLICIES AND CYBER LAWS :</b> Need for An Information Security Policy, Introduction to Indian Cyber Law, Objective and Scope of the Digital Personal Data Protection Act 2023, Intellectual Property Issues, Overview of Intellectual Property Related Legislation in India, Patent, Copyright, Trademarks  | 04      |
| <b>Text books:</b> <ol style="list-style-type: none"> <li>1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, Publish Date 2013.</li> <li>2. Basta, Basta, Brown, Kumar, Cyber Security and Cyber Laws, 1st Edition , Cengage Learning publication</li> <li>3. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla, KLSI. "Introduction to information security and cyberlaws". Dreamtech Press. ISBN: 9789351194736, 2015.</li> <li>4. Cyber Security and Data Privacy by Krishan Kumar Goyal , Amit Garg , Saurabh Singhal , HP HAMILTON LIMITED Publication, ISBN-13-978-1913936020</li> <li>5. Thomas J. Mowbray, "Cybersecurity: Managing Systems, Conducting Testing</li> <li>6. Investigating Intrusions", Copyright © 2014 by John Wiley &amp; Sons, Inc, ISBN: 978 - 1-118 -84965 - 1.</li> <li>7. James Graham, Ryan Olson, Rick Howard, "Cyber Security Essentials", CRC Press, 15-Dec 2010. Anti- Hacker Tool Kit (Indian Edition) by Mike Shema, McGraw-Hill Publication.</li> </ol> |   |         |

## 10. Sports and Yoga-II: (0 0 3) Non Credit