

Faculty of Engineering & Technology
P.K.University
Shivpuri (MP)



Evaluation Scheme & Syllabus
B.Tech -Textile Technology
First Year (I & II Sem)
(Effective from session 2019-20)

EVALUATION SCHEME

SEMESTER I

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-101	Engineering Mathematics-I	30	70	NA	NA	NA
BTTT -102	Engineering Physics-I	30	70	25	25	150
BTTT -103	Engineering Chemistry	30	70	25	25	150
BTTT -104	Basic Electrical Engineering	30	70	25	25	150
BTTT -105	Computer System & Programming in C	30	70	25	25	150

SEMESTER II

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT -201	Engg. Maths-II	30	70	NA	NA	100
BTTT -202	Engineering Physics-II	30	70	25	25	150
BTTT -203	Elements of Mechanical Engg	30	70	25	25	150
BTTT -204	Professional Communication	30	70	25	25	150
BTTT -205	Basic Electronics	30	70	NA	NA	100

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I Year I Semester

BTTT -101 :ENGINEERING MATHEMATICS – I

Unit - 1: Differential Calculus – I

Successive Differentiation, Leibnitz's theorem, Limit, Continuity and Differentiability of functions of several variables, Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Change of variables, Curve tracing: Cartesian and Polar coordinates.

Unit - 2: Differential Calculus - II

Taylor's and Maclaurin's Theorem, Expansion of function of several variables, Jacobian, Approximation of errors, Extreme of functions of several variables, Lagrange's method of multipliers (Simple applications).

Unit - 3: Matrix Algebra

Types of Matrices, Inverse of a matrix by elementary transformations, Rank of a matrix (Echelon & Normal form), Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and Eigen vectors, Cayley-Hamilton Theorem, Diagonalization, Complex and Unitary Matrices and its properties

Unit - 4: Multiple Integrals

Double and triple integrals, Change of order of integration, Change of variables, Application of integration to lengths, Surface areas and Volumes – Cartesian and Polar coordinates. Beta and Gamma functions, Dirichlet's integral and its applications.

Unit - 5: Vector Calculus

Point function, Gradient, Divergence and Curl of a vector and their physical interpretations, Vector identities, Tangent and Normal, Directional derivatives. Line, Surface and Volume integrals, Applications of Green's, Stokes and Gauss divergence theorems (without proof).

Text Books:

1. E. Kreyszig, Advanced Engineering Mathematics, John-Wiley & Sons
2. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw- Hill Publishing Company Ltd.
3. R.K.Jain&S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning.
3. Thomas & Finley, Calculus, Narosa Publishing House

4. Rukmanadachari, Engineering Mathematics – I, Pearson Education.

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I Year I Semester

BTTT -102 :ENGINEERING PHYSICS-I

Unit – I: Relativistic Mechanics

Inertial & non-inertial frames, Galilean transformations, Michelson-Morley experiment, Einstein's postulates, Lorentz transformation equations, Length contraction & Time dilation, Relativistic addition of velocities; Variation of mass with velocity, Mass energy equivalence, Concept of rest mass of photon.

Unit – II: Modern Physics: Black body radiation spectrum, Weins law and Rayleigh-Jeans law, Assumption of quantum theory of radiation, Planck's law. Wave-particle duality, de-Broglie matter waves, Bohr's quantization rule, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrödinger's wave equation (Time dependent and time independent) – particle in one dimensional potential box, Eigen values and Eigen function.

Unit – III: Wave Optics: Interference: Coherent sources, Interference in thin films (parallel and wedge shaped film), Newton's rings and its applications..

Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating.

Unit – IV: Polarization and Laser

Polarization: Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Retardation Plate, Optical Activity, Fresnel's theory, Specific rotation.

Laser: Spontaneous and stimulated emission of radiation, population inversion, Einstein's Coefficients, Concept of 3 and 4 level Laser, Construction and working of Ruby, He-Ne lasers and laser applications.

Unit – V: Fiber Optics and Holography : Fiber Optics: Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Single and Multi Mode Fibers, Dispersion and Attenuation.

Holography: Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

Reference Books:

1. Concepts of Modern Physics - Arthur Beiser (Mc-Graw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick (Wiley)
3. Optics –Ajoy Ghatak(Tata McGraw Hill Education Private Ltd. New Delhi)
4. Optics - Brijlal & Subramanian (S. Chand)
5. Engineering Physics- C. Mani Naidu(Pearson)

6. Lasers Principles, Types and Applications- K R Nambiar (New Age)

ENGINEERING PHYSICS LAB

List of Experiments

Any ten experiments, at least four from each group:

Group -A

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.
3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.
4. To determine the specific rotation of cane sugar solution using polarimeter.
5. To determine the wavelength of spectral lines using plane transmission grating.
6. To study the polarization of light by simple reflection using laser.
7. Measurement of Wavelength of a laser (He-Ne) light using single slit diffraction.

Group – B

8. To determine the specific resistance of a given wire using Carey Foster's bridge.
9. To study the variation of magnetic field along the axis of current carrying - Circular coil and then to estimate the radius of the coil.
10. To verify Stefan's Law by electrical method.
11. To calibrate the given ammeter and voltmeter by potentiometer.
12. To study the Hall effect and determine Hall coefficient, carrier density and - mobility of a given semiconductor using Hall effect set up.
13. To determine the energy band gap of a given semiconductor material.
- 14 To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.
15. To draw hysteresis curve of a given sample of ferromagnetic material and from - this to determine magnetic susceptibility and permeability of the given specimen.
16. To determine the ballistic constant of a ballistic galvanometer.
17. To determine the coefficient of viscosity of a liquid.
18. Measurement of fiber attenuation and aperture of fiber.
19. High resistance by leakage method.
20. Magnetic Susceptibility of paramagnetic solution.

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I Year I Semester

BTTT -103 :ENGINEERING CHEMISTRY

- Unit-1** Molecular orbital theory and its applications to homo-nuclear diatomic molecules. Band theory of solids. Liquid crystals and its applications. Point defects in Solids. Structure and applications of Graphite and Fullerenes. Concepts of nano-materials and its applications
- Unit-2** Polymers: Basic concepts of polymer- blends and composites. Conducting and biodegradable polymers. Preparations and applications of some industrially important polymers(Buna N, Buna S, Neoprene, Nylon 6, Nylon 6,6 , Terylene). General methods of synthesis of organometallic compound (Grignard Reagent) and their applications in polymerization.
- Unit-3** Electrochemistry: Galvanic cell, electrode potential, Lead storage battery. Corrosion, causes and its prevention. Setting and hardening of cement, applications of cement. Plaster of paris. Lubricants- Classification, mechanism and applications..
- Unit-4** Hardness of water. Disadvantage of hard water. Boiler troubles, Techniques for water softening; Lime-soda, Zeolite, Ion exchange resin, Reverse osmosis. Phase Rule and its application to water system.
- Unit-5** Fuels; Classification of fuels. Analysis of Coal. Determination of Calorific values (bomb calorimeter &Dulong's method). Biogas. Elementary ideas and simple applications of UV, Visible, IR and H1NMR spectral Techniques.

Textbook

1. Chemistry for Engineers, by S. Vairam and Suba Ramesh; Wiley India

Reference Books

1. Textbook of Engineering Chemistry by Dr. Gopal Krishna Bhatt, Acme Publishers
2. Chemistry (9th ed), by Raymond Chang, Tata McGraw-Hill
3. Chemistry Concepts and Applications by Steven S. Zumdahl; Cengage Learning
4. Engineering Chemistry, Wiley India
5. Engineering Chemistry Author: AbhijitMallick, Viva Books
6. Text Book of Engineering Chemistry by Harsh Malhotra; Sonali Publications
7. Concise Inorganic Chemistry by J.D. Lee; Wiley India
8. Organic Chemistry (6 ed) by Morrison & Boyd; Pearson Education
9. Physical Chemistry by Gordon M. Barrow; Mc-Graw Hill
10. Organic Chemistry, Volume 1(6 ed)& 2 (5ed) by I. L. Finar; Pearson Education

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I Year I Semester
BTTT -103: ENGINEERING CHEMISTRY

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA .
3. Determination of available chlorine in bleaching powder.
4. Determination of chloride content in water sample.
5. Determination of iron content in the given solution by Mohr's method.
6. pH- metric titration.
7. Viscosity of an addition polymer like polyester by viscometer.
8. Determination of iron concentration in sample of water by colorimetric method.
The method involves the use of KCN as a chelating agent and the measurements are carried out at 480nm.
9. Element detection and functional group identification in organic compounds.
10. Preparation of Bakelite and Urea formaldehyde resin.

Note: Institute can replace two experiments from the aforesaid experiments as per

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I Year I Semester
BTTT -104 BASIC ELECTRICAL ENGINEERING

DETAILED SYLLABUS

Unit-I : Electrical Circuit Analysis:

Introduction, Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, Source transformation, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current.

Unit-II: Steady- State Analysis of Single Phase AC Circuits:

Analysis of series and parallel RLCCircuits, Concept of Resonance in series & parallel circuits, bandwidth and quality factor; Apparent, active & reactive powers, Power factor, Concept of power factor improvement and its improvement (Simple numerical problems)

Network theorems (AC & DC with independent sources): Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem (Simple numerical problems)

Unit-III : Three Phase AC Circuits:

Three phase system-its necessity and advantages, Star and delta connections, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement (simple numerical problems).

Measuring Instruments: Types of instruments, Construction and working principles of PMMC and moving iron type voltmeters & ammeters, Single phase dynamometer wattmeter, Use of shunts and multipliers (Simple numerical problems on shunts and multipliers)

Unit-IV: Magnetic Circuit:

Magnetic circuit concepts, analogy between electric & magnetic circuits, B-H curve, Hysteresis and eddy current losses, Magnetic circuit calculations (Series & Parallel).

Single Phase Transformer: Principle of operation, Construction, EMF equation, Equivalent circuit, Power losses, Efficiency (Simple numerical problems), Introduction to auto transformer.

Unit-V: Electrical Machines:

DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)

Three Phase Induction Motor: Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only)

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Text Books:

1. "Basic Electrical Engineering", S N Singh; Prentice Hall International
2. "Basic Electrical Engineering", Kuldeep Sahay, New Age International Publishers
3. "Fundamentals of Electrical Engineering", B Dwivedi, A Tripathi; Wiley India
4. "Principles of Electrical Engineering", V. Del Toro,; Prentice Hall International
5. "Electrical Engineering", J. B. Gupta, Kataria and Sons

Reference Books:

1. "Electrical and Electronics Technology", Edward Hughes; Pearson
2. "Engineering Circuit Analysis", W.H. Hayt & J.E. Kimerly; McGraw Hill
3. "Basic Electrical Engineering", C L Wadhwa; New Age International
4. "Basic Electrical Engineering", T.K. Nagsarkar, M.S. Shukhija; Oxford University Press

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I Year I Semester

BTTT -104 ELECTRICAL ENGINEERING LABORATORY

LIST OF EXPERIMENTS

Note: A minimum of ten experiments from the following should be performed

1. Verification of Kirchhoff's laws
2. Verification of Superposition theorem
3. Verification of Thevenin's Theorem and Maximum Power Transfer Theorem.
4. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor
5. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
6. Connection and measurement of power consumption of a fluorescent lamp (tube light).
7. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
8. Determination of parameters of ac single phase series RLC circuit
9. To observe the B-H loop of a ferromagnetic material in CRO.
10. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer
11. Determination of efficiency of a dc shunt motor by load test
12. To study running and speed reversal of a three phase induction motor and record speed in both directions.

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BTTT -105 COMPUTER SYSTEMS AND PROGRAMMING IN C

Unit1:

Basics of Computer: Introduction to digital computer, basic operations of computer, functional components of computer, Classification of computers.

Introduction to operating system: [DOS, Windows, Linux and Android] purpose, function, services and types.

Number system: Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic.

Basics of programming: Approaches to Problem Solving, Concept of algorithm and flow charts, Types of computer languages:- Machine Language, Assembly Language and High Level Language, Concept of Assembler, Compiler, Loader and Linker.

Unit2:

Standard I/O in “C”, **Fundamental data types-** Character type, integer, short, long, unsigned, single and double floating point, Storage classes- automatic, register, static and external, Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity.

Fundamentals of C programming: Structure of C program, writing and executing the first C program, Components of C language. Standard I/O in C.

Unit3:

Conditional program execution: Applying if and switch statements, nesting if and else, use of break and default with switch, program loops and iterations: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, functions with array, passing values to functions, recursive functions.

Unit 4:

Arrays: Array notation and representation, manipulating array elements, using multi dimensional arrays. Structure, union, enumerated data types

Unit 5:

Pointers: Introduction, declaration, applications File handling, standard C preprocessors, defining and calling macros, conditional compilation, passing values to the compiler.

Reference:

1. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education .
2. Computer Basics and C Programming by V.Rajaraman , PHI Learning Pvt. Limited – 2015.
3. Programming in C by Kochan Stephen G. Pearson Education – 2015.
4. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication .
5. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
6. Computer Fundamentals and Programming in C. ReemaThareja, Oxford Publication
7. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
8. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning - 2007.
9. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
10. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication
11. Computer Fundamental and C programming by K K Gupta, Acme Learning Publication

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I Year I Semester
BTTT -105 COMPUTER PROGRAMMING LAB

- 1.WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.
- 2.WAP that calculates the Simple Interest and Compound Interest. The Principal , Amount, Rate of Interest and Time are entered through the keyboard.
- 3.WAP to calculate the area and circumference of a circle.
- 4.WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula $C/5=(F-32)/9$.
- 5.WAP that swaps values of two variables using a third variable.
- 6.WAP that checks whether the two numbers entered by the user are equal or not.
- 7.WAP to find the greatest of three numbers.
- 8.WAP that finds whether a given number is even or odd.
- 9.WAP that tells whether a given year is a leap year or not.
- 10.WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:
Between 90-100%-----Print 'A'
80-90%-----Print 'B'
60-80%-----Print 'C'
Below 60%-----Print 'D'
- 11.WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.
- 12.WAP to print the sum of all numbers up to a given number.
- 13.WAP to find the factorial of a given number.
- 14.WAP to print sum of even and odd numbers from 1 to N numbers.
- 15.WAP to print the Fibonacci series.
- 16.WAP to check whether the entered number is prime or not.
- 17.WAP to find the sum of digits of the entered number.
- 18.WAP to find the reverse of a number.
- 19.WAP to print Armstrong numbers from 1 to 100.
- 20.WAP to convert binary number into decimal number and vice versa.
- 21.WAP that simply takes elements of the array from the user and finds the sum of these elements.
- 23.WAP to find the minimum and maximum element of the array.

24. WAP to search an element in an array using Linear Search.
25. WAP to sort the elements of the array in ascending order using Bubble Sort technique.
26. WAP to add and multiply two matrices of order $n \times n$.
27. WAP that finds the sum of diagonal elements of a $m \times n$ matrix.
28. WAP to implement `strlen()`, `strcat()`, `strcpy()` using the concept of Functions.
29. Define a structure data type `TRAIN_INFO`. The type contains Train No.: integer type Train name: string Departure Time: aggregate type `TIME` Arrival Time : aggregate type `TIME` Start station: string End station : string The structure type `Time` contains two integer members: hour and minute. Maintain a train timetable and implement the following operations:
 - (i) List all the trains (sorted according to train number) that depart from a particular section.
 - (ii) List all the trains that depart from a particular station at a particular time.
 - (iii) List all the trains that depart from a particular station within the next one hour of a given time.
 - (iv) List all the trains between a pair of start station and end station.
30. WAP to swap two elements using the concept of pointers.
31. WAP to compare the contents of two files and determine whether they are same or not.
32. WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.

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I Year II Semester

BTTT-201 ENGINEERING MATHEMATICS – II

Unit - 1: Ordinary Differential Equations

Linear differential equations of n th order with constant coefficients, Complementary function and Particular integral, Simultaneous linear differential equations, Solution of second order differential equations by changing dependent & independent variables, Method of variation of parameters, Applications to engineering problems (without derivation).

Unit - 2: Series Solution and Special Functions

Series solution of second order ordinary differential equations with variable coefficient (Frobenius method), Bessel and Legendre equations and their series solutions, Properties of Bessel function and Legendre polynomials.

Unit - 3: Laplace Transform

Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

Unit - 4: Fourier Series and Partial Differential Equations

Periodic functions, Dirichlet's Conditions, Fourier series of arbitrary periods, Euler's Formulae, Even and odd functions, Half range sine and cosine series, Gibbs Phenomena.

Solution of first order Lagrange's linear partial differential equations, Second order linear partial differential equations with constant coefficients.

Unit - 5: Applications of Partial Differential Equations

Classification of second order partial differential equations, Method of separation of variables for solving partial differential equations, Solution of one and two dimensional wave and heat conduction equations, Laplace equation in two dimension, Equation of transmission lines.

Text Books:

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
2. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw- Hill Publishing Company Ltd.
3. R.K.Jain&S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning.
3. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudranalaya
4. A. C. Srivastava& P. K. Srivastava, Engineering Mathematics, Vol. – II, PHI Learning Pvt. Ltd.
5. Rukmangadachari, Engineering Mathematics – II, Pearson Education.

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I Year II Semester

BTTT -202 ENGINEERING PHYSICS- II

LTP-

Unit – I: Crystal Structures and X-ray Diffraction

Space lattice, basis, Unit cell, Lattice parameter, Seven crystal systems and Fourteen Bravais lattices, Co-ordination number, Atomic radius and Packing factor of different cubic structures, Crystal structure of NaCl and diamond, Lattice planes and Miller Indices, Diffraction of X-rays by crystal, Laue's experiment, Bragg's Law, Bragg's spectrometer. Compton Effect.

Unit – II: Dielectric and Magnetic Properties of Materials

Dielectric Properties: Dielectric constant and Polarization of dielectric materials, Relation between E, D and P, Types of Polarization (Polarizability). Equation of internal fields in liquid and solid (One-Dimensional), Clausius-Mossotti equation, Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Ferroelectricity, Piezoelectricity.

Magnetic Properties: Magnetization, Origin of magnetic moment, Dia, para and ferro magnetism, Langevin's theory for diamagnetic material, Phenomena of hysteresis and its applications.

Unit – III: Electromagnetic Theory

Equation of continuity, Maxwell's Equations (Integral and Differential Forms) and its derivations, Displacement Current, Poynting vector and Poynting theorem, EM - Wave equation and its propagation characteristics in free space, non-conducting and conducting media, energy density of electromagnetic wave, Skin depth.

Unit – IV: Band Theory of Solids

Free electron Theory, Formation of bands in Solids, Classification of solids on band theory, Density of states, Fermi-Dirac distribution, Concept of effective mass, Charge carrier density (electrons and holes), Conductivity of semiconductors, carrier concentrations Fermi energy, Position of Fermi level in intrinsic and in extrinsic semiconductors. Temperature dependence of conductivity in semiconductors.

Unit – V: Physics of some technologically important Materials

Superconductors: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, London equations, Josephson theory, persistent currents, Type I and Type II superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Super-conductors.

Nano-Materials: Basic principle of nanoscience and technology, structure, properties and uses of Fullerene, Carbon nanotubes Single and double walled nanotubes, synthesis of nanotubes, Properties and Applications of nanotubes.

Reference books:

1. Concept of Modern Physics - by Beiser (Tata Mc-Graw Hill)
2. Solid State Physics - by C. Kittel, 7th edition (Wiley Eastern)
3. Materials Science and Engineering - by V. Raghavan (Prentice- Hall India)
4. Solid State Physics - by S.O. Pillai, 5th edition (New Age International)
5. Introduction to Electrodynamics - by David J. Griffith (PH I)
6. Engineering Physics- C. Mani Naidu(Pearson)
7. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New D

**PROFESSIONAL COMMUNICATION
LABORATORY PRACTICAL'S****LTP-**

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A)

LIST OF PRACTICAL'S

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistics / Kinesics.
4. Presentation Skills of Technical Paper/Project Reports/Professional Reports based on proper Stress and Intonation Mechanics.
5. Official /Public Speaking based on Rhythmic Patterns.
6. Theme-Presentation /Key-Note Presentation based on correct argumentation methodologies.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehensions Skills based on Reading and Listening Practical on a model Audio-Visual Usage.

Reference Books

1. Bansal R.K. & Harrison: Phonetics in English, Orient Longman, New Delhi.
2. Sethi & Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi.
3. L.U.B. Pandey & R.P. Singh, A Manual of Practical Communication, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
4. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press.

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BTTT-203 ELEMENTS OF MECHANICAL ENGINEERING

UNIT-I:

Force System: Force, Parallelogram Law, Lami's theorem, Principle of Transmissibility of forces. Moment of a force, Couple, Varignon's theorem, Resolution of a force into a force and a couple. Resultant of coplanar force system. Equilibrium of coplanar force system, Free body diagrams, Determination of reactions.

Concept of Centre of Gravity and Centroid and Area Moment of Inertia, Perpendicular axis theorem and Parallel axis theorem

UNIT-II:

Plane Truss: Perfect and imperfect truss, Assumptions and Analysis of Plane Truss by Method of joints and Method of section.

Beams: Types of beams, Statically Determinate Beams, Shear force and bending moment in beams, Shear force and bending moment diagrams, Relationships between load, shear and bending moment.

UNIT-III:

Simple stress and strain: Normal and shear stresses. One Dimensional Loading; members of varying cross section, bars in series. Tensile Test diagram for ductile and brittle materials, Elastic constants, Strain energy.

Bending (Flexural) Stresses: theory of pure bending, neutral surface and neutral axis, stresses in beams of different cross sections.

Engineering Materials: Importance of engineering materials, classification, mechanical properties and applications of Ferrous, Nonferrous and composite materials.

UNI-IV:

Basic Concepts and Definitions of Thermodynamics: Introduction and definition of thermodynamics, Microscopic and Macroscopic approaches, System, surrounding and universe, Concept of continuum, Thermodynamic equilibrium, Thermodynamic properties, path, process and cycle, Quasi static process, Energy and its forms, Work and heat. Thermodynamic definition of work.

Zeroth law of thermodynamics: Temperature and its' measurement.

First law of thermodynamics: First law of thermodynamics, Internal energy and enthalpy. First law analysis for non-flow processes. Non-flow work Steady flow energy equation; Boilers, Condensers, Turbine, Throttling process, Pumps etc.

UNIT-V:

Second law: Thermal reservoir, Kelvin Planck statement, Heat engines, Efficiency; Clausius' statement Heat pump, refrigerator, Coefficient of Performance. Carnot cycle, Carnot theorem and its corollaries. Clausius inequality, Concept of Entropy.

Properties of pure substances: P-v, T-s and h-s diagram, dryness fraction and steam tables. Rankine Cycle.

Internal Combustion Engines: Classification of I.C. Engines and their parts, working principle and comparison between 2 Stroke and 4 stroke engine, difference between SI and CI engines. P-v and T-s diagrams of Otto and Diesel cycles, comparison of efficiency.

Books & References:

1. Engineering Mechanics: Statics by J.L Meriam, Wiley
2. Engineering Mechanics : Statics and Dynamics by R. C. Hibbler, Pearson
3. Strength of Materials by Timoshenko & Young
4. Mechanics of Solid by R. C. Hibbler, Pearson
5. Engineering Thermodynamics by P.K. Nag, McGraw Hill
6. Thermodynamics An Engineering Approach by Cengel & Boles, McGraw Hill
7. Engineering Thermodynamics by P. Chattopadhyay, OXFORD Publication
8. Internal Combustion Engine by V Ganesan, McGraw Hill Pub .
9. An Introduction to Mechanical Engineering by Wickert & Lewis, Cengage Learning
10. Engineering Mechanics By S. S. Bhavikatti, K. G. Rajashekarappa, New Age International
11. Engineering Mechanics by R K Bansal, Laxmi Publications
12. Fundamentals of Mechanical Engineering by Sawhney, PHI
13. Basic Mechanical Engineering by Pravin Kumar, Pearson

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I Year II Semester

ELEMENTS OF MECHANICAL ENGINEERING LAB

Note: Any 10 experiments (Minimum of 3 from each module) are to be conducted.

Module 1:

1. To conduct the tensile test and determine the ultimate tensile strength, percentage elongation for a mild steel specimen.
2. To conduct the Impact-tests (Izod / Charpy) on Impact-testing machine to find the Impact Strength of the specimen.
3. To determine the hardness of the given specimen using Vicker/Brinell/Rockwell hardness testing machine.
4. To conduct experiment on Torsion of Rod/wire.

Module 2:

1. To Study the working of 2 stroke Diesel/Petrol engine.
2. To Study and working of 4 stroke Petrol/Diesel engine.
3. To Study the model of Babcock and Wilcox and Lancashire boiler.
4. To Study various types of Mounting and Accessories of Boilers.

Module 3:

1. To verify the parallelogram, and Triangle law.
2. To verify the polygon law of force.
3. To determine the coefficient of friction on inclined surface.
4. To determine the efficiency and Mechanical Advantage of Worm & Worm-wheel.
5. To conduct experiment on Force Analysis on simple truss and Jib-crane Apparatus.
6. To conduct friction experiment on screw-jack.

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I Year II Semester

BTTT -204 PROFESSIONAL COMMUNICATIONS

Unit-1
Fundamentals of
Communications

Technical Communication: features: Distinction between General And Technical Communication; Language as a tool of communications; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of communication: Downward, Upward, Lateral/Horizontal (Peer group) : Importance of technical communication; Barriers to Communication.

Unit-II
Written
Communication

Words and Phrases: Word formation, Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; correct Usage: all Parts of Speech; Modals; Concord; Articles; Infinitives; Transformation of sentences; Requisites f Sentence Construction: Paragraph Development: Techniques and Methods- Inductive, Deductive, Spatial , Linear, Chronological etc.

Unit-III
Business
Communication

Principles, Sales & Credit letters; Claim and Adjustment Letters; Job Application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance; Negotiation skills.

Unit-IV
Presentation
Strategies and Soft
Skills.

Nuances and Modes of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Interpersonal communication: Definition; Types; Team work; Attitude; Way to improve Attitude Listening Skills : Types; Methods for improving Listening Skills.

Unit –V
Value- Based

Following essays from the prescribed text book with emphasis on Mechanics of writing.

Text Readings

- (i) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
- (ii) The Language of Literature and Science by A. Huxley
- (iii) Man and Nature by J. Bronowski
- (iv) Science and Survival by Barry Commoner
- (v) The Mother of the Sciences by A.J. Bahm.

Text Book

1. Improve your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
2. Technical Communication- Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
3. Functional skills in Language and Literature, by R.P. Singh, Oxford Univ. Press, 2005, New Delhi.

Reference Books

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
2. Business Correspondence and Report Writing by Prof. R.C., Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd. , 2001, New Delhi.
3. Word Power Made Easy by Norman Lewis, W.R. Goyal Pub. & Distributors, 2009, Delhi.

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I Year II Semester

BTTT -205 BASIC ELECTRONICS

- Unit I PNP-N junction diode:** Introduction of Semiconductor Materials Semiconductor Diode: Depletion layer, V-I characteristics, ideal and practical, diode resistance, capacitance, Diode Equivalent Circuits, Transition and Diffusion Capacitance, Zener Diodes breakdown mechanism (Zener and avalanche) Diode Application: Series , Parallel and Series, Parallel Diode Configuration, Half and Full Wave rectification, Clippers, Clampers, Zener diode as shunt regulator, Voltage-Multiplier Circuits Special Purpose two terminal Devices :Light-Emitting Diodes, Varactor (Varicap) Diodes, Tunnel Diodes, Liquid-Crystal Displays.
- Unit-II Bipolar Junction Transistors and Field Effect Transistor:** Bipolar Junction Transistor: Transistor Construction, Operation, Amplification action. Common Base, Common Emitter, Common Collector Configuration DC Biasing BJTs: Operating Point, Fixed-Bias, Emitter Bias, Voltage-Divider Bias Configuration. Collector Feedback, Emitter-Follower Configuration. Bias Stabilization. CE, CB, CC amplifiers and AC analysis of single stage CE amplifier (re Model). Field Effect Transistor: Construction and Characteristic of JFETs. AC analysis of CS amplifier, MOSFET (Depletion and Enhancement)Type, Transfer Characteristic,
- Unit- III Operational Amplifiers :** Introduction and Block diagram of Op Amp, Ideal & Practical characteristics of Op Amp, Differential amplifier circuits, Practical Op-Amp Circuits (Inverting Amplifier, Non inverting Amplifier, Unity Gain Amplifier, Summing Amplifier, Integrator, Differentiator).
- OPAMP Parameters:** Input offset voltage, Output offset voltage, Input biased current, Input offset current Differential and Common-Mode Operation
- Unit- IV Electronic Instrumentation and Measurements:** Digital Voltmeter : Introduction, RAMP Techniques Digital Multimeters: Introduction Oscilloscope: Introduction, Basic Principle, CRT , Block Diagram of Oscilloscope, Simple CRO, Measurement of voltage, current phase and frequency using CRO, Introduction of Digital Storage Oscilloscope and Comparison of DSO with Analog Oscilloscope.
- Unit- V Fundamentals of Communication Engineering:** Elements of a Communication System, Need of Modulation, Electromagnetic spectrum and typical applications. Basics of Signal Representation and Analysis, Introduction of various analog modulation techniques, Fundamentals of amplitude modulation, Modulation and Demodulation Techniques of AM.

Text Books:

1. Robert L. Boylestand / Louis Nashelsky "*Electronic Devices and Circuit Theory*", Latest Edition, Pearson Education.
2. H S Kalsi, "Electronic Instrumentation", Latest Edition, TMH Publication,.
3. George Kennedy, "Electronic Communication Systems", Latest Edition, TMH,

Reference Books:

1. David A. Bell, "*Electronic Devices and Circuits*", Latest Edition, Oxford University Press.
2. Jacob Millman, C.C. Halkias, StayabrataJit, "*Electronic Devices and Circuits*", Latest Edition ,TMH.
3. David A. Bell, Electronic Instrumentation and Measurements, Latest Edition, Oxford University Press India.

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Evaluation Scheme & Syllabus
B.Tech -Textile Technology
First Year (III & VI Sem)
(Effective from session 2019-20)

**B.TECH- TEXTILE TECHNOLOGY
SEMESTER-III**

B.TECH- TEXTILE TECHNOLOGY SEMESTER-III						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-301	Mathematics-III	30	70	NA	NA	100
BTTT-302	Yarn Manufacture -I	30	70	25	25	50
BTTT-303	Data Structures	30	70	25	25	50
BTTT-304	Fabric Manufacture-I	30	70	25	25	50
BTTT-305	Textile Fibre-I	30	70	25	25	50
BTTT-306	Environment & Ecology	30	70	NA	NA	100

**B.TECH- TEXTILE TECHNOLOGY
SEMESTER-IV**

TEXTILE ENGG.						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-401	Nano Science	30	70	NA	NA	100
BTTT-402	Textile Fibre-II	30	70	25	25	150
BTTT-403	Chemical Processing of Textiles-I	30	70	25	25	150
BTTT-404	Yarn Manufacture-II	30	70	25	25	150
BTTT-405	Fabric Manufacture-II	30	70	25	25	150
BTTT-406	Universal Human Values & Professional Ethics	30	70	NA	NA	100

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II Year Semester-III

BTTT-301: ENGINEERING MATHS–III

L T P 3 1 0

UNIT I

Numerical Techniques – I: Zeroes of transcendental and polynomial equations, Bisection method, Regula-falsi method, Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, Newton's forward and backward interpolation. Lagrange's and Newton's divided difference formula for unequal intervals.

UNIT II

Numerical Techniques –II: Solution of system of linear equations, Matrix Decomposition methods, Jacobi method, Gauss- Seidal method.

Numerical differentiation & Integration: Trapezoidal rule, Simpson's one third and three-eight rules, Solution of ordinary differential equations (first order, second order and simultaneous) by Euler's, Picard's and fourth-order Runge- Kutta methods.

UNIT III

Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves, Correlation, Linear, non – linear and multiple regression analysis, Binomial, Poisson and Normal distributions. Tests of significations: Chi-square test, t-test.

UNIT IV

Function of Complex variable: Analytic function, C-R equations, Harmonic Functions, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's and Laurent's series, Singularities, Zeroes and Poles, Residue theorem.

UNIT V

Integral Transforms: Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z- Transform and its application to solve difference equation.

Text Books:

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House..
2. Jain, Iyenger Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi
3. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd.

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II Year Semester-III

BTTT-302: YARN MANUFACTURE-I

UNIT -I

Process flow chart for carded & combed yarn manufacturing. **Cotton Ginning:-** Introduction of ginning process, Functions of ginning machines, Types of Ginning machines, Pre and post ginning machines used and their objects, Factors affecting ginning performance, Influence of ginning on fibre, yarn and fabric quality, Pressing and bailing of Indian and foreign cotton, dimensions. Objects of mixing, different types of mixing & blending), Difference between mixing & blending.

UNIT- II

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, evolution of opening and cleaning principles. Various components & zones of blow room machines, Conventional blow room machines. Lap forming mechanism, Reasons of developments in blow room, machinery, Research findings and developments of modern blow room.

UNIT- III

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, flexiclean, Waste extracted at various openers and beaters, Cleaning efficiency of different machines, nep generation.

UNIT- IV

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 – Leveling action – Fibre breakage. Calculation.

UNIT- V

Stripping and grinding, Stripping action and carding action, Card Clothing, evolution and Metallic wire details — Card wire mounting, wave defects, carding related draft and production, Tandem carding, Auto leveller used in carding, Modern development in carding made by various renewed carding machine manufacturers, Blow room & card related calculations.

References:

1. The Textile Institute Publication - Manual of Textile Technology –Short StapleSpinning Series by W.Klein
2. ‘The Characteristics of Raw Cotton’ by P. Lord. The TextileInstitute Publication, Manual of Cotton Spinning Vol.II,Part-I.
3. ‘Opening and Cleaning’ by Shirley. The Textile Institute Publication, Manual ofCotton Spinning Vol. II,Part-II.
4. ‘Opening Cleaning and Picking’ by Dr.Zoltan S. Szaloki, Institute of TextileTechnology, Virginia.
5. ‘Cotton Ginning’ Textile Progress, The Textile InstitutePublication.
6. Blowroom and Carding- Training Programme conducted by NCUTE, IIT, Delhi.
7. Essential calculations of practical cotton spinning by TKPattab

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II Year Semester-III
BTTT-303: DATA STRUCTURES

UNIT- I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade-off.

Abstract Data Types (ADT), Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations.

Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

UNIT- II

Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

UNIT- III

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: In order, Preorder and Post order, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

UNIT- IV

Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijkstra Algorithm, Introduction to Activity Networks.

UNIT- V

Searching: Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Search Trees: Binary Search Trees (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees .

Hashing: Hash Function, Collision Resolution Strategies. Storage

Management: Garbage Collection and Compaction.

References:

1. Aaron M. Tenenbaum, Yediyah Langsam and Moshe J. Augenstein, "Data Structures Using C and C++", PHI Learning Private Limited, Delhi India
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.
1. Lipschutz, "Data Structures" Schaum's Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.
2. Thareja, "Data Structure Using C" Oxford Higher Education.
3. AK Sharma, "Data Structure Using C", Pearson Education India.
4. Rajesh K. Shukla, "Data Structure Using C and C++" Wiley Dreamtech Publication.
5. Michael T. Goodrich, Roberto Tamassia, David M. Mount "Data Structures .

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II Year Semester-III

BTTT-304-FABRIC MANUFACTURE-I

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

Geometrical aspects: - Cone angle, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, calculations, Calculations: winding speed, production/spindle & per machine, and efficiency.

UNIT III

Objectives of pirn winding, its advantage over rewound weft, Details semi-automatic and automatic pirn winding machines w. r. t drive to spindles, traverse, tensioning yarn path. Pirn build: - length of wind, chase length, diameter, bunch, tail ends etc. their importance during weaving process. Calculations: - Average pirn diameter, winding speed, production / spindle / & per machine, efficiency, number of looms fed by spindle.

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.), Principles of operation of beam warping and sectional warping. Sectional warping machines, Waxing attachment, computerized warping machines.

UNIT V

Objectives of sizing and sizing terminology, achieving the objectives through sizing paste constituents, concepts of sizing process: hank sizing, ball warp sizing, Slasher sizing, multi-cylinder sizing, description of sizing ingredients, Latest developments in sizing process by various sizing machine manufacturers.

References:

1. Principles of weaving By Marks A.T.C. & Robinson.
2. Weaving By Prof. DB Ajgaonkar, Prof. Sriramalu & Prof. MK Talukdar.
3. Weaving Mechanism by K.T. Aswani.
4. Winding & Warping by Talukdar MK.
5. Yarn Preparation-Vol-I by Sengupta.
6. Weaving Calculation by Sengupta.
7. Textile Mathematics-Vol. I by JE Booth.
8. Fibre to Fabric by PRLord

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II Year Semester-III

BTTT-305: TEXTILE FIBRE-I

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.

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

Jute cultivation, retting and extraction process, structure of jute fibre, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like flax, hemp, ramie, banana, bamboo fibre etc. and their applications.

UNIT- IV

Types of wool and its grading, Morphological structure, chemical composition, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc. and their applications.

UNIT- V

Types of silk and its production, chemical composition and morphological structure of silk, physical & chemical properties of silk and its applications.

References:

1. WE Morton & JWS Hearle, Physical properties of textile fibres, Textile Institute, U.K.
2. Progress in textiles: Science and technology Vol.-2 by Dr. VK Kothari, IITDelhi.
3. Hand book of textile fibres by J. GordonCook
4. Fibre Science and Technology, SPMishra

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II Year Semester-III

BTTT- 306: ENVIRONMENT & ECOLOGY

UNIT-I

Definition, Scope & Importance, Need For Public Awareness• Environment definition, Eco system - Balanced ecosystem, Human activities - Food, Shelter, Economic and social Security.

Effects of human activities on environment Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

UNIT-II

Natural Resources• Water Resources- Availability and Quality aspects. Water borne diseases, Water Induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles-- Carbon, Nitrogen and Sulphur Cycles.

Energy - Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro-Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio.gas. Hydrogen as an alternative future source of Energy.

UNIT-III

Environmental Pollution and their effects. Water pollution, Land pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management, e-waste management

Current Environmental Issues of Importance: Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution. Acid Rain Ozone Layer depletion, Animal Husbandry,

UNIT-IV

V Environmental Protection- Role of Government, Legal aspects, initiatives by Non-Governmental organizations (NGO), Environmental Education, Women Education,

Text Books

1. Environmental Studies -Benny Joseph- Tata Mcgraw Hill-2005
2. Environmental Studies- Or. D.L. Manjunath, Pearson Education-2006.
3. Environmental studies - R, Rajagopalan -Oxford Publication • 2005.
4. Text book of Environmental Science & Technology- M. Anji Reddy- US Publication .

Reference Books

1. Principles of Environmental Science and Engineering -P. Venugoplan Rao, Prentice Hall of India.
2. Environmental Science and Engineering- Meenakshi, Prentice Hall India

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Semester-III

BTTT-302: YARN MANUFACTURE-I LAB

Practice in handling and operation of blow room, study of constructional details of machinery in blow room, calculating speed of different machine parts, Blows per inch of Krishna beater, Production calculation of blow room, various controls points and changes Places, Practice in checking the quality of laps, Study of driving mechanism and calculation of speed of different parts & production of card, Study of different setting points on card.

BTTT-303: DATA STRUCTURE USING C LAB

Program in C or C++ for following:

1. To implement addition and multiplication of two 2D arrays.
2. To transpose a 2D array.
3. To implement stack using array.
4. To implement queue using array.
5. To implement circular queue using array.
6. To implement stack using linked list.
7. To implement queue using linked list.
8. To implement circular queue using linked list.
9. To implement binary tree using linked list.
10. To implement binary search tree using linked list.
11. To implement tree traversals using linked list.
12. To implement BFS using linked list.
13. To implement DFS using linked list.
14. To implement Linear Search.
15. To implement Binary Search.
16. To implement Bubble Sorting.
17. To implement Selection Sorting.
18. To implement Insertion Sorting.
19. To implement Merge Sorting.
20. To implement Heap Sorting.

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BTTT-304: FABRIC MANUFACTURE-I LAB

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 and drum winding machine.
4. Study of cheese winding machine.
5. Study of auto conerc its functions
6. Study of pirn winding machine
7. Study of sectional warping machine
8. Study of beam warping machine

BTTT-305: TEXTILE FIBRE-I LAB

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.

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II year Semester-IV

BTTT -401: NANO SCIENCE

UNIT I

Introduction: Definition of Nano-Science and Nano Technology, Applications of Nano-Technology.

Quantum Theory for Nano Science: Particle in a box, Potential step: Reflection and tunneling (Quantum leak). Penetration of Barrier, Potential box (Traped particle in 3D: Nanodot).

Physics of Solid State Structures: Size dependence of properties, crystal structures, face centered cubic nanoparticles; Tetrehedrally bounded semiconductor structures; lattice vibrations.

Energy Bands: Insulators, semiconductor and conductors; Reciprocal space; Energy bands and gaps of semiconductors; effective masses; Fermi Surfaces.

Localized Particles: Acceptors and deep taps; mobility; Excitons.

UNIT II

Quantum Nanostructure: Preparation of quantum wells, Wires and Dots, Size and Dimensionality effect, Fermi gas; Potential wells; Partial confinement; Single electron Tunneling, Infrared detectors; Quantum dot laser superconductivity.

Properties of Individual Nano Particles: Metal nano clusters; Magic numbers; Theoretical modeling of nano particles; geometric structure; electronic structure; Reactivity, Fluctuations, Magnetic clusters; Bulk to nanostructure, semiconducting nanoparticles, Optical Properties, Photo fragmentation, Coulombic Explosion. Rare Gas & Molecular clusters; Inert gas clusters; Superfluid clusters; Molecular clusters.

UNIT III

Growth Techniques of Nanomaterials: Litho and Nonlithograpahic techniques, RF Plasma, Chemical methods, Thermolysis, Pulsed laser method, Self-assembly, E-beam evaporation, Chemical Vapour Deposition, Pulsed Laser Deposition.

UNIT IV

Methods of Measuring Properties: Structure: X-ray Diffraction Technique, Particle size determination, surface structure. Microscopy: Scanning Probe Microscopy (SPM), Atomic Force Microscopy (AFM), Field Ion Microscopy, Scanning Electron Microscopy, Transmission Electron Microscopy(TEM). Spectroscopy: Infra red and Raman Spectroscopy, X-ray Spectroscopy, Magnetic resonance, Optical and Vibrational Spectroscopy, Luminescence.

UNIT V

Carbon Nano Materials: Bucky Ball and Carbon Nano- Tubes: Nano structures of carbon (fullerene), Fabrication, Structure. Electrical, Mechanical and Vibrational properties and applications. Nano Diamond, Boron Nitride Nano-tubes, Single Electron Transistors, Molecular Machine, Nano-Biometrics, Nano Robots.

Text/Reference Books:

1. CP Poole Jr, FJ Owens, "Introduction to Nanotechnology".

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Semester-IV

BTTT-402: TEXTILE FIBRE-II

UNIT I

Classification of man made fibers, definition of regenerated and synthetic fibers, Concepts of molecular weight, Degree of polymerization, Orientation and Crystallinity, Characteristics of fiber forming polymer.

UNIT II

Introduction to methods of fiber formation by melt spinning, dry spinning, & wet spinning, Polyethylene terephthalate fiber (PET) – History of development, Brief manufacturing process, Polymer production by DMT & PTA route, Chips drying, , physical & chemical properties of polyester fibers, applications.

UNIT III

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

UNIT IV

Polyacrylonitrile fibers, Polyurethane fibers brief manufacturing process by wet and dry spinning, physical and chemical properties of acrylic fibers & its applications, Properties of polyethylene fiber, Type of polypropylene (PP), Properties of polypropylene fiber. Introduction of High Performance fibers.

UNIT V

Introduction to regenerated fiber, Raw material for viscose rayon, Manufacturing sequence of viscose fiber, Steeping and pressing, Cutting and shredding, Ageing, Xanthation of sodium cellulose, Mixing and filtration, Ripening, Wet spinning of viscose rayon, Introduction to Acetate, Triacetate fibers and Lyocell fibers.

References:

1. Textile Fibers – Vol.-I by VA Shenai, Sevak Publications, Bombay,1971.
2. Textile Fibers – H V S Murthy, Textile Association Publication,1995.
3. ATextbookofFibreScienceandTechnologybyS.P.Mishra,NewageInternational (p) limited, 2000.
4. Hand book of Textile Fibres Vol. I & II by Gorden & Cook, Merrrow Publication Ltd, England
5. Man Made Fibres – RW Moncrieff, HeywoodBooks.

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Semester-IV

BTTT-403: CHEMICAL PROCESSING OF TEXTILES-I

UNIT- I

PRETREATMENTS: Introduction of pretreatments in wet processing. Introduction to shearing and cropping machines. Objects, working principle, types of shearing, Objects of singeing, Methods of singeing - gas singeing for woven & knitted fabrics, Introduction to efficiency of singeing, Evaluation & efficiency of singeing.

UNIT -II

DESIZING: Objects of desizing, Mechanism of desizing. Inter-relation of desizing with singeing and sizing, Various methods of desizing: Hydrolytic & oxidative method of desizing, Evaluation of efficiency of desizing.

UNIT- III

SCOURING: Object of scouring, Scouring with alkali & solvent assisted desizing, Interrelation between desizing and scouring, Study of batch-wise & continuous methods of scouring, Concept of bio-scouring, Evaluation of efficiency of scouring.

UNIT- IV

BLEACHING: Objects of bleaching, Introduction to bleaching agents like sodium hypochlorite, hydrogen peroxide & per-acetic acid, Bleaching of cotton, polyester & its blends, Batch-wise & continuous machinery for bleaching, Bleaching of wool, silk, Concept of AOX, Evaluation of efficiency of bleaching. Continuous scouring and bleaching:
Pretreatment Range

UNIT- V

MERCERIZATION: Introduction & objects of mercerization, Effect of mercerization on structure of cellulose, Machinery used for yarn, woven and knit fabrics, Concept of hot mercerization & liquid ammonia mercerization, testing methods to evaluate efficiency of mercerization like Barium Activity, Number, Axial Ratio & Luster index. Objects of finishing, classification of finishes. Heat setting principle & mechanism & machines stenter.

References:

1. Chemical technology of fibrous materials by F. Sadov.
2. Chemical processing of polyester I cellulosic blends by RM Mittal & SS Trivedi.
3. Chemical processing of synthetic blends by KV Datye & AA Vaidya.
4. Mercerization by JT Marsh.
5. Introduction to Textile Bleaching by JT Marsh.
6. Bleaching, Dyeing & Chemical technology of textiles fibres by S. R. Trotman.
7. Technology of Bleaching by VA Shenai.
8. Bleaching & mercerizing by BTRA Silver Jubilee Monograph Series.
9. Chemical Technology in the pretreatments of textiles by SR Karmarkar

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Semester-IV

BTTT-404: YARN MANUFACTURE-II

UNIT- I

Functions of draw-frame, principles of drafting and doubling, Study of constructional details and design of drafting systems, weighting in draw frame, draft distribution, doubling and blending, drafting force, details of drafting system, evolution of drafting systems at draw-frame (Shirley 4/4 drafting, platts, pressure bar, Whiten accu drafting, Rieter polar drafting systems etc.

UNIT- II

Coiling system and stop motion, calculations relating to speeds, drafts, production etc, design, Suction at draw-frame. Automatic can handling, Auto leveling at draw-frame. On-line quality monitoring and control, Study of draw-frames available in the market. Blending at draw-frame, Study of maintenance aspects and design developments such as rollers, roller weightings, drafting systems etc. Developments in draw frame drafting, Suction at draw-frame, Automatic can handling, Auto leveling at draw-frame.

UNIT - III

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- IV

Constructional details of Comber- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber, Study of combing cycle, Semi combing, normal combing, super combing and double combing., Forward and backward combing, Comber Settings, Norms for production, speed, Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality, Automatic and centralized noil extraction, Automatic materials handling. Stop motions in comber, Technical specifications of modern combers available in the worldmarket.

UNIT- V

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, Bobbin building, stop motions. Study of mechanisms like – differential motion, building mechanism, semi-automatic and automatic doffing, Performance assessment of Speed-frame – norms, Zero break concept, block creeling, Materials handling. Link –mechanism, Features of modern speed-frame machines.

References:

1. The Textile Institute Publication –Manual of Textile Technology-Short Staple Spinning Series Vol. I to V by W.Klein
2. The characteristics of Raw Cotton by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol II, Part-I.
3. Fundamentals of Spun Yarn Technology, By Carl Lawrence.
4. Blow room and carding –Training program conducted by NCUTE, IIT Delhi.
5. Carding by F. Charanlay. The Textile Institute publication, Manual of cotton spinning series Vol - III.
6. Drawing, Combing and roving and speed frame by Zoltan, S. Szaloky, The Institute of Textile Technology, Virginia.
7. Drawing, Combing and roving and speed frame by Zoltan, S. Szaloky, The Institute of Textile Technology, Virginia

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IV SEMESTER

BTTT-405: FABRIC MANUFACTURE-II

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, Different kinds of fabrics: Grey, mono-colour, multi-colour, warp or weft stripes, checks etc.

UNIT II

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

UNIT- III

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- IV

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.

UNIT -V

Limitations of automatic loom, objectives for developing automatic loom, scope for automation, design features of automatic loom, drives- loom motions, accessories and other critical features of automatic looms, weft feelers- construction & working of side sweep, electrical & electronic weft feelers, their merits, demerits & applications.

Automatic let-off motion: Principles and requirements of automatic let-off mechanism, types of Automatic loom: pirn change, shuttle change loom, detailed study of various motions of automatic looms, warp stop motion- types, construction and working of mechanical & electrical warp stop motion, centre weft fork motion, construction and working of centre weft fork motion and its advantages.

Construction & working Multiple box motion, their types, two colours and four-colour drop box motion, brief description of pick-at will, pick and pick motion, Pick finding, heald leveling, light indicators; pick counters need, functions & use, i) Auto loom fabric defects, causes and remedies, Calculations pertaining to dobby, jacquard and automatic looms production and efficiency.

References:

1. Yarn preparation by R.Sengupta
2. An introduction to winding & warping by M.K.Talukdar
3. Modern preparation & weaving machinery by A Ormerod, Textile Institute,U.K.
4. Sizing by Prof. D. B. Ajaonkar, Dr. M. K. Talukdar & V. R.Wadekar.
5. The Technology of Warp Sizing by J.B.Smith.
6. Modern Preparation & Weaving by A.Ormerod

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BTTT-402: TEXTILE FIBRE-II LAB

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.

BTTT-403: CHEMICAL PROCESSING OF TEXTILES -I LAB

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing:

1. Desizing of cotton material.
2. Scouring of cotton material.
3. Bleaching of cotton material:
(a) hypochlorite bleaching (b) chlorite bleaching (c) peroxide bleaching
4. Blueing /optical whitening of cotton material.
5. Degumming of silk material.
6. Bleaching of silk material.
7. Optical whitening of silk material.
8. Mercerisation of cotton material.

BTTT-404: YARN MANUFACTURE-II LAB

1. Study of constructional details of draw-frame,
2. Driving arrangement and calculation of speeds, draft and production of D/F.
3. Processing of Material on Draw frame and evaluating performance.
4. Study of constructional details & Driving arrangement and calculation of Speed Frame.
5. Study of sliver lap machine and calculation of speeds of different parts and production calculations of sliver lap.
6. Study of sliver lap machine and calculation of speeds of different parts and production calculations of Ribbon lap.
7. Study of sliver lap machine and calculation of speeds of different parts and production calculations of comber.

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BTTT-405: FABRIC MANUFACTURE-II LAB

1. General study of drop boxmotion.
2. General study of mechanical Jacquard and method of cardcutting.
3. Study of Cam doobby and paper cardcutting.
4. Study & working of weft feelermotion.
5. Study & working of auto let-offmotion.
6. Study and working of pirn changemotion.
7. Study and working of shuttle changemotion.
8. Study of various doobymechanics.
9. Study the mechanism of multiple boxmotion.
10. Study of various jacquardlooms.

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BTCH-406: UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS

Human Values and Professional Ethics

[L-T-P: 3-0-0]

Course Objectives

This introductory course input is intended

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature

Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Methodology

1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. It is free from any dogma or value prescriptions.
3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.
4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.
5. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.

Course Syllabus: Universal Human Values and Professional Ethics

[L-T-P: 3-0-0]

The whole course is divided into 5 modules.

After every two lectures of one hour each, there is a 2 hour practice session.

The teachers are oriented to the inputs through an eight to ten day workshop (Teachers' Orientation Program).

The Teacher's Manual provides them the lecture outline. The outline has also been elaborated into presentations and provided in a DVD with this book to facilitate sharing.

The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue. The process of dialogue is enriching for both, the teacher as well as the students. The syllabus for the lectures is given below:

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UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

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

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
2. Understanding the needs of Self (‘I’) and ‘Body’ - *Sukh* and *Suvidha*
3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
5. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure *Sanyam* and *Swasthya*
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

1. *Understanding Harmony in the family – the basic unit of human interaction*
2. 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
3. Understanding the meaning of *Vishwas*; Difference between intention and competence
4. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
5. Understanding the harmony in the society (society being an extension of family):
Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
6. Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*),
Universal Order (*Sarvabhaum Vyawastha*)- from family to world family!
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

7. Understanding the harmony in the Nature
8. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
9. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
10. Holistic perception of harmony at all levels of existence
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

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

11. Natural acceptance of human values
12. Definitiveness of Ethical Human Conduct
13. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
14. 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,
 - c) Ability to identify and develop appropriate technologies and management patterns for above production systems.
15. Case studies of typical holistic technologies, management models and production systems
16. 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

Guidelines and Content for Practice Sessions

UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

PS 1: Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcomings in your life? Observe and analyze them.

Expected outcome: the students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

PS 2: Now-a-days, there is a lot of voice about many techno-genic maladies such as energy and natural resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. – all these seem to be man-made problems threatening the survival of life on Earth – What is the root cause of these maladies & what is the way out in your opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression & suicidal attempts, etc – what do you think, is the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

Expected outcome: the students start finding that technical education without study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all problems and the sustained solution could emerge only through understanding of human values and value based living. Any solution brought out through fear, temptation or dogma will not be sustainable.

PS 3:

1. Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of

i) What is Naturally Acceptable to you in relationship- Feeling of respect or disrespect?

ii) What is Naturally Acceptable to you – to nurture or to exploit others? Is your living the same as your natural acceptance or different?

2. Out of the three basic requirements for fulfillment of your aspirations- right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

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Expected outcome:

1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.
2. The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

PS 4: List down all your desires. Observe whether the desire is related to Self (I) or Body. If it appears to be related to both, see which part of it is related to Self (I) and which part is related to Body.

Expected outcome: the students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to 'I' and 'Body' distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfillment of the needs of the body assuming that it will meet the needs of 'I' too.

PS 5:

1. a. Observe that any physical facility you use, follows the given sequence with time :
Necessary & tasteful → unnecessary & tasteful → unnecessary & tasteless → intolerable
b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If naturally acceptable, you want it continuously and if not acceptable, you do not want it any moment!
2. List down all your activities. Observe whether the activity is of 'I' or of Body or with the participation of both 'I' and Body.
3. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

Expected outcome:

1. The students are able to see that all physical facilities they use are required for a limited time in a limited quantity. Also they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.
2. the students are able to see that activities like understanding, desire, thought and selection are the activities of 'I' only, the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of 'I' while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both 'I' and body.

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3. The students become aware of their activities of 'I' and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance.

PS 6:

1. Chalk out programs to ensure that you are responsible to your body- for the nurturing, protection and right utilisation of the body.
2. Find out the plants and shrubs growing in and around your campus. Find out their use for curing different diseases.

Expected outcome: The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

PS 7: Form small groups in the class and in that group initiate dialogue and ask the eight questions related to trust. The eight questions are :

- 1a. Do I want to make myself happy? 2a. Do I want to make the other happy?
- 3a. Does the other want to make him happy?
- 4a. Does the other want to make me happy?
- 1b. Am I able to make myself always happy?
- 2b. Am I able to make the other always happy?
- 3b. Is the other able to make him always happy?
- 4b. Is the other able to make me always happy?

What is the answer?

Intention (Natural Acceptance)

What is the answer?

Competence

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate your intention & competence as well as the others' intention & competence.

Expected outcome: The students are able to see that the first four questions are related to our Natural Acceptance i.e. Intention and the next four to our Competence. They are able to note that the intention is always correct, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person.

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PS 8:

1. Observe on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under- evaluation, over-evaluation or otherwise evaluation.
2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

Expected outcome: The students are able to see that respect is right evaluation, and only right evaluation leads to fulfillment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms, and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

PS 9:

1. Write a note in the form of story, poem, skit, essay, narration, dialogue to educate a child. Evaluate it in a group.
2. Develop three chapters to introduce 'social science- its need, scope and content' in the primary education of children

Expected outcome: The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

PS 10: List down units (things) around you. Classify them in four orders. Observe and explain the mutual fulfillment of each unit with other orders.

Expected outcome: The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfillment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation (in terms of nurturing, protection and right utilization) in the nature.

PS 11:

1. Make a chart for the whole existence. List down different courses of studies and relate them to different units or levels in the existence.
2. Choose any one subject being taught today. Evaluate it and suggest suitable modifications to make it appropriate and holistic.

Expected outcome: The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are able to make out how these courses can be made appropriate and holistic.

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UNIT 5: Implications of the above Holistic Understanding of Harmony at all Levels of Existence

PS 12: Choose any two current problems of different kind in the society and suggest how they can be solved on the basis of natural acceptance of human values. Suggest steps you will take in present conditions.

Expected outcome: The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw roadmaps to achieve them.

PS 13:

1. Suggest ways in which you can use your knowledge of Technology/Engineering/ Management for universal human order, from your family to the world family.
2. Suggest one format of humanistic constitution at the level of nation from your side.

Expected outcome: The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/ Management to ensure mutually enriching and recyclable productions systems.

PS 14: The course is going to be over now. Evaluate your state before and after the course in terms of

- a. Thought b. Behavior and c. Work d. Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

Expected outcome: The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for a happy and prosperous society.

Reference Material:

The primary resource material for teaching this course consists of

a. The text book

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

b. The teacher's manual

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010

c. A set of DVDs containing

- Video of Teachers' Orientation Program
- PPTs of Lectures and Practice Sessions
- Audio-visual material for use in the practice sessions

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In addition, the following reference books may be found useful for supplementary reading in connection with different parts of the course:

1. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Publishers.
3. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *limits to Growth*, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
9. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.

Relevant websites, movies and documentaries

1. Value Education websites, <http://uhv.ac.in>, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*
6. Gandhi A., *Right Here Right Now*, Cyclewala Productions

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Evaluation Scheme & Syllabus
Department of Textile Technology
B.Tech. Third Year
(V & VI SEM)
(Effective from session 2019-20)

B.TECH- Textile Technology SEMESTER-V

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-501	Engineering & Managerial Economics	30	70	NA	NA	100
BTTT-502	Textile Testing-I	30	70	25	25	150
BTTT-503	Chemistry & Production of Fibres	30	70	NA	NA	100
BTTT-504	Yarn Manufacture-III	30	70	25	25	150
BTTT-505	Fabric Manufacture-III	30	70	25	25	150
BTTT-506	Fabric Structure & Analysis	30	70	25	25	150

B.TECH- Textile Technology SEMESTER-VI

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-601	Industrial management	30	70	NA	NA	100
BTTT-602	Coating of Textiles	30	70	NA	NA	100
BTTT-603	Textile Testing-II	30	70	25	25	150
BTTT-604	Structure & Properties of Fibres	30	70	NA	NA	100
BTTT-605	Yarn Manufacture-IV	30	70	25	25	150
BTTT-606	Fabric Manufacture-IV	30	70	25	25	150
	Yarn & Fabric Production Lab	NA	NA	25	25	50

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BTTT- 501: ENGINEERING & MANAGERIAL ECONOMICS

UNIT -I

Introduction of Engineering Economics and Demand Analysis: Meaning and nature of Economics, Relation between science, engineering, technology and economics; Meaning of Demand, Determinants of Demand, Shifts in demand, Law of Demand, Price Elasticity of Demand & Types, Income Elasticity, Cross price Elasticity, Determinants of Elasticity, uses and Importance of elasticity.

UNIT -II

Concept of Supply: Law of Supply, Factors affecting Supply, Elasticity of supply.

Demand Forecasting: Introduction, Meaning and Forecasting, Methods or Techniques of Demand Forecasting, Criteria for Good Demand Forecasting, Demand Forecasting for a New Product;

UNIT- III

Cost Analysis- Introduction, Types of Costs, Cost-Output Relationship: Cost Function, Cost-Output Relationships in the Short Run, and Cost-Output Relationships in the Long Run; Short run and long run, Break- Even Analysis; Production functions: laws of variable proportions, law of returns; Economies of scale: Internal and external.

UNIT- IV

Market Structure: Market Structure Perfect Competition, Imperfect competition – Monopolistic, Oligopoly, duopoly salient features of price determination and various market conditions.

UNIT- V

Nature and characteristics of Indian economy, concepts of LPG, elementary concepts of National Income, Inflation and Business Cycles, Concept of N.I. and Measurement., Meaning of Inflation, Types and causes, Phases of business cycle. Investment decisions for boosting economy (National income and per capital income)

TEXT BOOKS-

1. Premvir Kapoor, Sociology and Economics for Engineers, Khanna Publishing House (Edition 2018)
2. Salvatore D, "Principles of Microeconomics", Oxford University Press.
3. Koutsoyiannis A, "Modern Microeconomic", Macmillan Education Ltd.
4. Dwivedi DN, "Principles of Microeconomics", Pearson Education.
5. Cowell, FA, "Microeconomic Principles and Analysis", Oxford

Department of Textile Technology
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Semester-V

BTTT-502: TEXTILE TESTING-I

Unit (1): Introduction of textile testing (1), sampling, random sampling, biased sampling (1), sampling techniques, square, cut square, zoning technique (1), selection of sample for testing, grading of cotton fibre with respect to staple length (1), laboratory measurement of fibre length, span length, Baer sorter (1), Shirley photo electric staple, servo fibro graph (1), salient features of HVI(1).

Total Lectures Required = 7

Unit (2): Atmospheric conditions for testing, absolute & relative humidity, moisture regain & moisture content (1), importance of moisture in textiles, measurement of moisture regain & content (1), effect of moisture on properties (physical & mechanical) of textile material, factors affecting the regain (2), correct numerical weight, oven dry weight (1), shrilly moisture meter(1).

Total Lectures Required = 6

Unit (3): Dry and wet bulb hygrometer, sling assmann, hair hygrometers (2), control of testing room atmosphere (1), AFIS (1), Napping potential (1), Nep count (1), rating of neps, maturity coefficient measurement by NaOH method, fibre fineness by airflow meter & Sheffield micronaire(2).

Total Lectures Required = 9

Unit (4): Fibre bundle strength by Pressley, stelometer (2), fibre quality index, linear density of man made fibres and strength (1), spin finish, crimp (1), Trash, Shirley trash analyzer (1). Yarn numbering system (1), wrapping test for lap, sliver, roving (1),

Total Lectures Required = 7

Unit (5): determination of yarn count, diameter (1), average & resultant count of folded yarn, relation between Ne, D, T, Nm (1). Instruments used for determination of count, quadrant balance, Knowles balance, bees lay balance and physical balance (2), Twist, classification of twist, twist measurement, direct counting method, continuous twist tester, twist-untwist method, (2), Twist tester, (2), R.B. twist tester, level of twist(1).

Total Lectures Required = 9

Grand total of lectures required = 36

Reference Books: -

1. Quality control and testing management by Dr. V.K.Kothari
2. Principle of textile testing by J.E.Booth
3. Physical testing of textiles by B.P.Savile.

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Semester-V

BTTT-503: CHEMISTRY AND PRODUCTION OF FIBERS

Unit (1): Polyethylene Terephthalate Fibre – History of development, Polymer production by DMT & PTA route, Chips drying, Fibre manufacturing, Effect of process variable on properties of polyester fibre, some dope additives for specialty polyester fibre, Properties of polyester fibre.

Total Lectures required = 08

Unit (2): 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, Properties of Nylon 66 fibre, Brief introduction to Aramidfibres.

Total Lectures required =08

Unit (3): Introduction of polyolefin fibres, Polymerization of polyethylene, Polyethylene (PE) fibre formation, Properties of polyethylene fibre, Different type of polypropylene (PP), Polymerization of polypropylene, Polypropylene fibre formation, Properties of polypropylene fibre.

Total Lectures required =08

Unit (4): Introduction of vinyl fibres, Polyacrylonitrile (PAN) fibre, Use of ionic and neutral co-monomers, Polymerization of PAN, Acrylic fibre- formation by dry spinning, Dry –jet-wet spinning process, Effect of process variables on properties of PAN fibre, Dope formation, Properties of PAN fibre, Introduction to polyurethane fibre.

Total Lectures required = 08

Unit (5): Introduction of regenerated fibre, Concepts of regeneration of 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, Formation of serrated edge cross-section of viscose rayon, Viscose fibre properties, Introduction of cuprammonium rayon in brief, Introduction of cellulose acetate rayon in brief, Introduction of lyocell fibre in brief.

Total Lectures required =08

Grand total lectures required = 40

Books:

1. Manufactured fibre technology by V.B. Gupta & V.K.Kothari
2. Essential fibre chemistry by M.E.Cartor
3. Synthetic fibres by Fourne

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Semester-V

BTTT-504: YARN MANUFACTURE – III

Unit (1): Object of combing (1), system of lap preparation and study of their lap, ribbon-lap and super-lap machine (3), configuration of fibers feed and its effect on the quality of product, n oil percentage and fraction efficiency of comber (3).

Total Lecturers Required =7

Unit (2): Type of combers (2), distinguishing frameless of Hillman and Nasmith combers (3), detailed study of the Nasmith type comber (2), timing and setting of Nasmith comber for different classes of cotton (1), control of comber work (1), calculation pertaining to draft, production and noil percentage (1), recent developments in combing (1).

Total Lecturers Required =11

Unit (3): Objects of speed frame (1), conventional and modern roving processes (1), mechanism involved in drafting, twisting and winding (2), basic principle of designing of cone drum (2), differential motions and their working principles (2).

Total Lecturers Required =8

Unit (4): Builder motions their objects & types (1), working principles of any modern builder motion (1), drafting system (ordinary & high) (1), processing parameters for different hank roving (1).

Total Lecturers Required =4

Unit (5): Common defects in roving package their censes and remedies (2), calculations pertaining to gearing, contents, draft, TPI and production (2), twist multiplier and roving twist (1).

Total Lecturers Required =5

Grand Total of lectures required =35

Reference Book: -

4. Spun yarn technology Vol. I – A.Ventaksubramani
5. Elements of combing – Dr. A.R.Khare
6. A practical guide to combing & drawing – W.Klein
7. Cotton Spinning - Taggart
8. Spun Yarn Technology –Oxtoby.

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Semester-V

BTTT-505: FABRIC MANUFACTURE-III

Unit (1): General description of plain power looms (2), their mechanical details (2), tuning and adjustment (1). Classification of fabric and weaving machinery (2), introduction to weaving process, primary, secondary and auxiliary (2) motion of looms

Total Lectures Required = 9

Unit (2): Various ways of shedding (1), various types of sheds(1), over and under pick motion(1), beat up motion(1), tappet shedding,(1), idea of construction of tappet(1), underandoverpickmechanism(1),beatingupmotion(1),earlyandlateshedding, temples and its utility, idea about heads count and reed count in different system(1), terry mechanism(1)

Total Lectures Required =9

Unit (3): Negative and positive take up motion (1), negative and positive let-off motions (1), causes of shuttle flying and shuttle trapping (2), merits and demerits of negative of negative and positive take up and let of motion (2), 5 and 7 wheel take up motion. (2)

Total Lectures Required =8

Unit (4): Warp protecting motion (1), side and center weft fork motion (1), negative and positive dobbie (1), cross border dobbie. Preparation of lattice, Development in dobbie. Scope and limitations dobbie (1), brief description of Crompton dobbie, Knowles dobbie (1), paper dobbie (1), cross border dobbie (1), pegging plan dobbie faults and adjustment (1) Numerical problems on loom speed, production & efficiency (1).

Total Lectures Required = 9

Grand Total of lectures required = 35

Reference Books: -

1. Weaving mechanism by Fox.
2. Weaving mechanism by N.N.Bannerjee.
3. Weaving Calculation by R.Sengupta.
4. Weaving machine & mechanism by Talukdar.

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Semester-V

BTTT-506: FABRIC STRUCTURE & ANALYSIS

Unit (1): Classification of various fabrics (1), construction of plain weave and its derivatives (2), ordinary twill right hand twill (1), warp faced, weft faced & balanced twills (2), Satin regular, irregular and their extension (1).

Total Lectures Required = 7

Unit (2): combined twills, end to end and pick-to-pick combination (1). Fancy twills-large diagonal shaded twills (1), sateen base diagonals and brained twills (1), elongated twill-steep and low twills (1), pointed, wave zig-zag, curved, broken, herring bone, transposed, corkscrew twills (2), Diamond, mock leno, ordinary honeycomb, brighten honeycomb (2),

Total Lectures Required = 8

Unit (3): Huck-a-back and crepe weave (1), derivatives of hopsack barley corn stitched hopsack and twilled hopsack (2), Simple and wadded bedford cords (1), weft and piques (1), principle of figuring with extra material extra warp figuring (2) extra weft, limitation of extra thread (2).

Total Lectures Required = 9

Unit (4): Backed cloths (1), weft backed cloths, warp backed cloths with weeding threads (2), double cloths, center stitched, self stitched (2), inter changing double cloth, cut effect in interchanging double cloths (2).

Total Lectures Required = 7

Grand Total of lectures required = 31

Reference Book: -

1. W. Watson Textile Design & colour Longmans Greens Co.London.
2. Z.J Grosicki Watson's Textile design and colour Newnes Butter Worth,London.
3. Z.J. Grosicki, Advance Textile Design Newnes Butter Worth,London.
4. "Nishant" A Grammar of textile.

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Semester-V

BTTT-502: TEXTILE TESTING-I LAB

List of Experiments

1. Study of Zoning technique for selection of fibre sample.
2. Fibre Length by using Grease Plate Method.
3. Comb Sorter method for estimation of fibre length parameters.
4. Fibre Fineness by Cut-Weight Method.
5. Measurement of fibre fineness by airflow principle.
6. Fibre Maturity Measurement by Caustic Soda Method
7. Determination of trash content in cotton using Trash Analyzer.
8. Study of fibre parameters on AFIS.
9. Study of fibre parameters on HVI.
10. Determination of Neps in Card web by Shirley Template.
11. Determination of moisture content and regain by oven dry method.
12. Determination of moisture content by Shirley Moisture meter

BTTT-504: YARN MANUFACTURING-III LAB

Practice in handling operation, setting and gauging of lap former, comber and speed-frame, Study of constructional details of machines: various controls and change places etc., Practice in checking the quality of sliver, roving, comber lap and waste analysis, common fault and remedies, Calculation pertaining to gearing, speeds, constant, draft and production etc.

BTTT-505: FABRIC MANUFACTURE –III LAB

1. semi positive let-off, its calculation, settings
2. cam dobbie working principle, timing and setting
3. drop box mech, card preparation
4. jacquard mech, drive, setting and timing, card preparation.
5. weft passage of shuttleless loom
6. automatic cop change mechanism
7. practice of loom turning, snap study in weave room

NOTE: Experiments shall be decided on factors like:

1. Facilities installed at Institute.
2. Accessibility to Industry & nearby Institutes.
3. Trend of Technological Developments in National & International perspective

BTTT-506: FABRIC STRUCTURE & ANALYSIS LAB

Analysis of various types of fabric structures like plain, twill, satin, hopsack, barleycorn etc,

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Semester-VI

BTTT-601: INDUSTRIAL MANAGEMENT

Unit-I

Introduction: Concept, Development, application and scope of Industrial Management.

Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership.

Unit-II

Management Function: Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Social responsibilities of Management, Introduction to Human resources management: Nature of HRM, functions and importance of HRM.

Unit-III

Work Study: Introduction, definition, objectives, steps in work study, Method study: definition, objectives, and steps of method study, Work Measurement: purpose, types of study — stop watch methods — steps — allowances — standard time calculations — work sampling, Production Planning and Control

Inventory Control: Inventory, Cost, Deterministic Models, and Introduction to supply chain management.

Unit-IV

Quality Control: Process control, SQC, Control charts, Single, Double and Sequential Sampling, Introduction to TQM.

Unit-V

Project Management: Project network analysis, CPM, PERT and Project crashing and resource Leveling

1. BOOKS AND REFERENCE:

1. Statistical Quality Control by Grant and Leavarworth, McGraw Hill
2. Industrial Management By O P Khan.
3. Problems in Operations Research by- Prem Kumar Gupta & D.S. Hira, S. Chand

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Semester-VI

BTTT-602: COATING OF TEXTILES

Unit-1: Polymeric materials for coating- (Rubbers: natural and synthetic, (3)(Polyvinyl chloride, Polyurethane, Acrylic polymers, Adhesive treatment (4)

Total lecture required=7

Unit-2: Coating Methods: Knife coating (1), Roll coating (1) transfer coating (1), Rotary screen printing (2) calendaring hot melt coating (2)

Total lecture required=7

Unit-3: Physical properties of coated fabric (2) Rheology of coating (1), Rheological Behaviors of fluids (2) pastes (1) hydrodynamic analysis of coating (2)

Total lecture required=8

Unit-4: Fabric for foul weather protection- Clothing comfort (1) Impermeable coating (1) breathable fabric (1) Non Apparel coating (1), Fabrics for Chemical protection (1) Thermo chromic Fabric (1) Temperature Adaptable Fabrics (1) Camouflage nets (1) Metal and conducting polymer-coated fabrics (2) Radiation cured coating(1)

Total lecture required=8

Unit-5: Test methods, Coating per Unit area, Degree of fusion/curing of coating (1) blocking Abrasion resistance (1) Test for colour- Fastness to dry and wet rubbing, Resistance to water penetration (3) Air permeability (1) water vapour permeability (1) low temperature bend test (1) low temperature impact test (1)

Total lecture required=9

Grand Total lecture required=39

Reference Books:

1. Coating & Laminated Textiles by WaterFung
2. Coated Textile by A.K. Sen
3. Coated Fabric technology Vol 1-3 Technomicpublication
4. Coated & laminated Fabric by AATCCsymposium

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Semester-VI

BTTT-603: TEXTILE TESTING-II

Unit (1): Textile properties of yarn and fabric(2), stress-strain curve(1), various methods for finding of yield point(1), methods for finding of various modulus(1), destination of tenacity(1), stiffness of fabric(1).

Total Lectures Required = 7

Unit (2): Yarn testing m/cs- single yarn strength tester, lea strength tester (2), fabric strength tester- impact tester, Graph test, fabric B.S. Test (3), Scott serigraph, Instron testing m/c (2).

Total Lectures Required = 7

Unit (3): Fabric abrasion & resistance to wear (1), Bursting strength test (1), Tear test, Wear (1), Brief introduction of FAST & KAWABATA (1), estimation of fabric thickness, rigidity, air permeability (1), water repellency (1), drape handling (1), crimp, thermal transmission properties (1).

Total Lectures Required = 8

Unit (4): Cover factor of fabric (1), snagging-mace snagging test (1), weaver trials, advantages and disadvantages of weaver trial (1), lab test (1), measurement of lap, sliver, yarn irregularity (1) salient features of Uster evenness tester (2)

Total Lectures Required = 7

Grand Total of lectures required = 29

Reference Books: -

1. Physical testing of textiles by B.P.Saville.
2. Quality control and testing management by Dr. V.K.Kothari.
3. Principles of textile testing by J.E.Booth.
4. Quality control by V.K.Kothari.

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Semester-VI

BTTT-604: STRUCTURE AND PROPERTIES OF FIBRES

Unit (1): Moisture absorption, heat of absorption (2), differential heat of absorption, integral heat of absorption (2), Quantitative theory of heat moisture absorption (2), Rate of moisture absorption(1)

Total Lectures Required = 7

Unit (2): Mechanical properties of fibres (2), Relation between structure and mechanical properties of fibres (2), Basic mechanical properties (tenacity elongation, modulus, work of rupture (2), Elastic recovery, time effects (2).

Total Lectures Required = 8

Unit (3): Thermal behavior of textile fibres by DSC (2), TGA, thermal mechanical analysis (2), Density gradient column (2), Preparation of density gradient column (2).

Total Lectures Required = 8

Unit (4): Birefringence behavior, dielectric properties (2), fibre friction, fibre friction measurement (2), fibre yarn to surface friction measurement and static charge measurement (5)

Total Lectures Required = 7

Unit (5): Creep behavior (2), Optical properties of fibres (2), concept of moisture absorption by fibres (2), relation between fibre structure and fibre properties (2).

Total Lectures Required = 8

Grand Total of lectures required = 38

Reference Book: -

5. Manufactured fibre technology by V.B. Gupta, V.K.Kothari
6. Physical properties of fibre by J.W.S.Hearle
7. Thermal behavior of material by Turi
8. Modern yarn production by Ray
9. Textile fibres by ATIRA
10. ASTM Standard books
11. Absorbency charting
12. Polymers by fibre & textiles encyclopedia
13. Advances in fibre source by S.K.Mukhopadhyaya

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Semester-VI

BTTT-605: YARN MANUFACTURE– IV

Unit (1): Principle and mechanism involved in drafting, twisting & winding (2), ordinary and high draft system (2), yarn twist: Terminology, twist level, concept of twist multiplier (1), propagation of twist (2),

Total Lecturers Required = 7

Unit (2): Builder motion (2), common package size, limitations to large package spinning (2), types of rings and travelers and their common uses (2), Rising and falling lappets, control rings, apron drafting system (2)

Total Lecturers Required = 8

Unit (3): System of waste collection of ring frame and types of spinning wastes (2), limitation in ring spinning and factors responsible for loss in efficiency (1), yarn faults and their remedies (2), Recent developments in ring spinning (1).

Total Lecturers Required = 7

Unit (4): Doubling: - Objects and terminology (1), study of ring doublers (1), fancy yarns (1), sewing thread and tyre Cord (1). Reeling: Objects and terminology, types of reeling construction and working of a reel (2), yarn bundling (1), calculation of draft, TPI and production of ring frame & doubling frame (2),

Total Lecturers Required = 9

Grand Total of lectures required =31

Reference Books: -

14. Elements of ring frame & doubling – Dr. A.R.Khare
15. The technology of short-shape staple spinning – W.Klein
16. Cotton spinning – Taggart
17. Spun yarn technology –Oxtoby

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Semester-VI

BTTT-606: FABRIC MANUFACTURE-IV

Unit (1): Jacquards shedding (1), types of jacquards and their principle of working (2), cross border jacquards (2). Harness mounting London and Norwich system (1), Card cutting (1), limitations of jacquards, Jacquards-driving study of following jacquard. (4), (a). Single lift single cylinder (b). Double lift single cylinder (c). Double lift double cylinder (d). Electronic jacquard.

Total Lectures Required = 11

Unit (2): Different systems of harness tying. (2), terry mechanism (2), Recent development in jacquards (2)

Total Lectures Required = 6

Unit (3): Automatic looms – pirn (2), shuttle changing (2), Detailed study of various motions of automatic looms (2), cop changing loom (1), warp stop motions mechanical (1), electro-mechanical, electronic stop motion (1).

Total Lectures Required = 9

Unit (4): Multiple box motion, their types (2), principle of working of multiple box motion (1), two colours and four-colour drop box motion (1), brief description of pick-at will (1), pick and pick motion. On line process and quality control (1), estimation of productivity, snap study. (7)

Total Lectures Required = 7

Unit (5): Numerical problems concerning to above (5)

Total Lectures Required = 05

Grand Total of lectures required = 38

Reference Books: -

1. Weaving mechanism by Fox.
2. Weaving mechanism by N.N.Bannergy.
3. Weaving Calculation by R.Sengupta.
4. Weaving machine & mechanism by Talukdar

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Semester-VI

BTTT-603: TEXTILE TESTING-II LAB

Use of microscope for testing of yarns for appearance, twist and diameter, measurement of evenness, measurement of yarn strength, tenacity, elongation at break, modulus, crimp rigidity, fabric testing for dimension, weight, thickness, shrinkage and air permeability, Fabric testing for elongation, tensile, bursting, and tearing strength, abrasion resistance, flexural rigidity, crease recovery and draping qualities of fabric

BTTT-605: YARN MANUFACTURE- IV LAB

Operating, setting and gauging of ring frame and doubling frame, study of constructional details of machinery, various controls, change places etc., Practice in checking the quality of single and double yarn, common yarn faults and their remedies, calculations pertaining to gearing, speeds, constant, draft, TPI and production in ring frame and doubling frame.

BTTT-606: FABRIC MANUFACTURE-IV LAB

Construction, names of parts, setting of automatic pirn change, drop box motions, and shuttle box, Names of parts, setting and fitting of warp protecting, warp and weft stop motions.

BTTT-YARN & FABRIC PRODUCTION LAB

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Evaluation Scheme & Syllabus
Department of Textile Technology
B.Tech. Third Year
(VII & VIII SEM)
(Effective from session 2019-20)

B.TECH- TEXTILE TECHNOLOGY SEMESTER-VII

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-701	Entrepreneurship Development	30	70	NA	NA	100
BTTT-702	Functional Clothing	30	70	NA	NA	100
BTTT-703	Fiber Manufacturar & Process Control	30	70	NA	NA	100
BTTT-704	Knitting Technology	30	70	25	25	150
BTTT-705	Garment manufacture Technology	30	70	NA	NA	100
	Industrial Training	NA	NA	25	25	50
	Mini Project	NA	NA	25	25	50

B.TECH- TEXTILE TECHNOLOGY SEMESTER-VIII

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTTT-801	Non-Conventional Energy Resources	30	70	NA	NA	100
BTTT-802	High Performance Fiber	30	70	NA	NA	100
BTTT-803	Mill Planning & Organization	30	70	NA	NA	100
BTTT-804	Technical Textiles	30	70	NA	NA	100
	Project	NA	NA	25	25	50
	Seminar	NA	NA	25	25	50

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Semester-VII

(L T P 3 1 0)

BTTT-701: ENTREPRENEURSHIP DEVELOPMENT

UNIT –I: Entrepreneurship- definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. 5 Government policy for small scale industry; stages in starting a small scale industry. 2 (10)

UNIT -II Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods. 8

UNIT -III Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

UNIT -IV Project Planning and control: The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication. 9

UNIT -V Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. 5 Role of various national and state agencies which render assistance to small scale industries.

Text / Reference Books:

1. Forbat, John, "Entrepreneurship" New AgeInternational.
2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New AgeInternational
3. Joseph, L. Massod, "Essential of Management", Prentice Hall of India.

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Semester-VII

BTTT- 702: FUNCTIONAL CLOTHING

(L T P 2 00)

Unit 1: Definition of functional clothing, Classification of functional clothing, Functional finishes, ways to apply functional finishes on textile surfaces, Functional clothing market review

Unit 2: Functional Protective clothing: Nuclear biological Chemical protective clothing, extreme cold clothing; design, mechanism and applications, Fire retardant clothing, approaches to achieve fire retardancy in clothing, mechanism of fire retardancy, Soft and hard body armour , super thickening fluids (non-nutonean) for body armour, water proof beathable fabrics, ways to achieve waterproofness and breathability intextiles

Unit 3: Medical functional clothing: therapeutic and rehabilitative clothing, biosensing clothing, wound healing promoting dressings, antimicrobial sutures

Unit 4: Sportswear clothing: moisture management in sportswear, compression textiles, Aerodynamics, Spacesuit design and development, woven and knitted sportswear,

Unit 5: Cosmetotextiles: definition, classification, mechanism to develop various cosmetic effects in textiles, various cosmetoingredients, worldwide scene of cosmetotextiles, Smart Textiles, classification of smart textiles, Intelligent textiles, , mechanism of various types of smart textiles, Wearable electronics

Reference Books

1. Functional Finishes for Textiles: Improving Comfort, Performance and Protection (Woodhead Publishing Series in Textiles), Raushan Paul
2. Functional Textiles and Clothing, [G. Thilagavathi.](#), [M. Parthiban](#), [S.Viju](#)
3. Woodhead Publishing
4. Electronics in Textiles and Clothing: Design, Products and Applications [L. Ashok Kumar](#), [C. Vigneswaran](#), CRC Press
5. Smart Clothes and Wearable Technology, [J. McCann](#) (Editor), [David Bryson](#) Woodhead Publishing Series in Textiles

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Semester-VII

BTTT-703: FIBRE MANUFACTURE & PROCESS CONTROL

(L T P- 3 1 0)

Unit-1: Melt spinning line-extruder, design features of extruder screws (2) mixing of additives, Continuous polymer filter, spin pack and spinneret(2) spinning pack disassembly, cleaning of spinnerets, inspection of spinnerets (2) spinning variables and conditions for continuous spinning, special features of high speed melt spinning(2). **Total of lectures required=9**

Unit-2: Quenching system and quench chamber, Different quenching system (2). High speed winder, automatic winder, metering pump (1), chips drying. (1) Effects of variable throughput rate. (2) Consequence of crystallization in chips on fibre spinning (2) structure formation during melt spinning (1). **Total of lectures required=8**

Unit-3: Introduction to solution spinning classification of solution spinning (2) wet spinning, coagulation in wet spinning, effect of coagulation conditions on fibre properties(2) dry spinning, spinning cell for dry spinning (2), Cross-section formation in dry-spinning, spin finish during dry- spinning, coagulation of viscose fibre in coagulation bath(4). Wet spinning in special context of viscose fibre manufacturing (1) **Total of lectures required=11**

Unit-4: Dry-jet-wet spinning, coagulation process (2) development of structure & morphology during dry-jet-wet spinning (2) importance of dry-jet-wet spinning (2) process control in dry-jet- wet spinning (2). Dry-jet wet spinning of high tenacity acrylic fibre (1) **Total of lectures required=9**

Unit-5: Role of spin-finish (2) introduction to spin finishes components (2) spin finish application. Different techniques of spin finish application, dipping roller method, metered finish system, quench duct lubricating system, spray technique(3). Electro spinning (1) **Total of lectures required=8**

Total of lectures required=45

Text Books & Reference Material:

- 1- Manufactured fibre technology-
V.B.Gupta & V.K.Kothari, Chapman & Hall
- 2- Textile Fibre-
V.K.Kothari (vol.2) IAFL Publication
- 3- High speed fibre spinning- A. Ziabicki- John Wiley
- 4- Essential fibre chemistry- M.E. Carter Marcel Dekker, N.York
- 5- Handbook of Fibre Science: M. Leolini and M. Pearce

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BTTT-704: KNITTING TECHNOLOGY

(L T P-3 1 0)

Unit 1: Difference between knits and wovens, knitting terms and definitions (Course,, wale, stitch density) different type of knitting needles: bearded needle, latch needle, sinker, jack, cam arrangement, overlap, under lap, closed lap, open lap.

Total Lectures required=8

Unit 2: Comparison of warp and weft knitting, Classification of weft knitting machine, elements of knitting machine like type of needles, sinkers, etc Needle numbering system, technology of loop formation, geometry of loop structure, Elements of loop structure: needle loop, sinker loop, relation between yarn count, machine gauge and stitch density.

Total Lectures required=9

Unit 3: Classification of knit-structures, loop formation on: single jersey, Rib machines and inters look machines, socks knitting technology, Loop formation on flat bed machine

Total Lectures required=9

Unit 4: Four primary base knitting structures: Plain knitted fabric, Rib fabric, Interlock and Purl fabric, Special knitting machines: Fabric machine, garment length machine, flat machine, circular machine fabrics and Spacer fabrics.

Total Lectures required =7

Unit 5: Basic warp knitting machines, classification of warp knitting, Modern developments in weft knitting technique, calculations regarding production, gsm, stitch density etc, Causes and remedies of faults of knitted fabrics.

Total Lectures required =9

Grand total of lectures required = 42

Reference and Text Book-

1. Knitting Technology –Chamberlin
2. Knitting Technology – W.J.Spencer
3. International Textile Journal –Knitting
4. Knitting Calculation –Chamberlin
5. Wet Knitting Vol. 1&2 –Published by IIT NewDelhi.
6. Knitting –NCUTE

Laboratory work: S per Lab Syllabus

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BTTT-705: GARMENT MANUFACTURE TECHNOLOGY

(L T P- 3 10)

Unit (1): Introduction to garment manufacturing technology, Sample cutting, ZFusing, Sewing, Pressing, Finishing and inspection, Line balancing concept.

Total Lectures required =8

Unit (2): Introduction to measurement of fabric dimensional properties, fabric comfort, thermal comfort, objective evaluation of fabric, low stress fabric properties, Kawabata system, fabric assurance by sample testing, fabric defects, Fabric inspection and feedback to back process.

Total Lectures required =9

Unit (3) Introduction to garment cutting, Marker planning, Efficiency of Marker planning, methods of marker planning and marker use, spreading of the fabric, to form a lay, spreading requirements, methods of spreading, fabric packages, objective of cuttings, methods of cuttings

Total Lectures required =9

Unit (4): Introduction to seam, stitch, stitch classification, stitch structure, seam formation, joining material, surface characteristics, seam appearance, damages (thermal and mechanical), seam performance, seam degradation, seam failure, seam puckering and seam testing. Sewing needle and sewing thread, thread consumption

Total Lectures required = 9

Unit 5: Introduction of spreading machines and cutting machines- types and functions, History of sewing machines. Sewing machinery- classification according to bed types, stitch types (hook or looper) material wise (extra light to heavy weight). Major parts of sewing machinery and functions. Parts, functions and adjustments of Over Lock: Collar turning machines, folding machinery fusing and pressing machinery, Computer controlled cutting, sewing, folding machinery. **Total Lectures required=8**

Grand total of lectures required = 42

Text Books and Reference material:

7. Introduction to Garment Manufacturing Technology By TRamchandran
8. Garment Manufacturing Technology by By TRamchandran
9. Practical Clothing Construction Part I & II by MaryMethews

Laboratory work:N

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BTTT-704: KNITTING TECHNOLOGY LAB

(L T P- 0 0 2)

To study the path of yarn through circular and flat knitting machine, different knitting elements including the cam system, driving mechanism of plain knitting machine, cloth take-up mechanism of plain knitting m/c, rib knitting m/c including arrangement of dial and cylinder needles, cam, system and driving mechanism, Interlock knitting m/c including arrangement of dial and cylinder needle, cam system and driving mechanism, Warp knitting machine constructional details and mechanism of operation.

BTTT-751: PROJECT

(L T P- 0 0 8)

Students will carry out minor project during seventh semester as a part of curriculum as per UPTU guidelines.

BTTT-752: INDUSTRIAL TRAINING (VIVA -VOICE)

(L T P- 0 0 2)

Students shall carryout industrial training as a part of their curriculum after the completion of their 3rd year for one month. After this their performance shall be evaluated during 7th semester by taking viva of each and every student.

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BTTT-801: NON-CONVENTIONAL ENERGY RESOURCES

(L T P -3 1 0)

UNIT-I: Introduction to various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits. 3 Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar cell power plant, limitations. 4

UNIT-II: Solar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focussing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations. 9

UNIT-III: Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations. 4 Magneto-hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations. 2 Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations. 3

UNIT-IV: Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations. 2 Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. Performance and limitations of energy conversion systems. 6

UNIT-V: Bio-mass: Availability of bio-mass and its conversion theory. 2 Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants. 3

Text/References Books:

1. Raja etal, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
3. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications, 2006.
4. D.S. Chauhan, "Non-conventional Energy Resources" New Age International.
5. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning. (14)

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BTTT-802:-HIGH PERFORMANCE FIBRES

(L T P 3 1 0)

Unit – I; Introduction- Definition, molecular dimensionality mechanical properties, Fibre markets, Hi -Performance Gelspun Polyethylene fibres- Manufacture, fibres characteristics, properties & applications. **Total lectures required=9**

Unit- II: Aramids- Introduction, polymer preparation, Spinning, Structure & properties, applications, Fibres based on liquid crystalline polymer (PPTA fibre). **Total lectures required=8**

Unit- III: Carbon Fibres- Physical properties, PAN bases Carbon fibres, Pitch based Carbon fibres, Vapour grown Carbon fibres, Applications. **Total lectures required= 8**

Unit-4:Glass Fibres- Glass for Fibres, Fibre manufacture, fibre finish, fibre properties& application, optical fibres. **Total lectures required=8**

Unit –5: Vectran (Melt spun wholly aromatic polyester fibre), Fibre production, properties & application, PBO (Polyphenylene benzobisoxazole) fibres- Fibre production, properties & application. PEEK Fibres -Fibre production, properties & application. **Total lectures required=9 Grand total of lectures required= 42**

Reference Books

1. High Performance Fibree by J.W.S.Hearle

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BTTT-803:- MILL PLANNING & ORGANIZATION

(L T P- 3 1 0)

Unit-I: Preparation of project—

Spinning/Weaving/Processing/Composite A- Selection of product

B- Site Selection (site, location, land and cost)

C- Building (single, double and multiple)

D- Plant and Machinery **Total lecture required 09**

Unit-II

1. Industrial hazards: i. Fire hazards, ii. Mechanical hazards, iii. Electrical etc

2. Safety rules for prevention of accidents

3. Humidification of textile mill- humidifier and humidification

4. Ventilation, floor cleaning in textile mills, lightning

5. Air conditioning and Refrigeration system

Total lecture required 08

UNIT III:

Balancing of machine (plant layout for machines-- balancing of machines, layout of different machines, calculation for balancing of machines for different processes—spinning, weaving)

Total lecture required 07

UNIT IV

Production Costing—various terms used in costing (cost volume, profit analysis, cost allocation on waste, effect on cost direct , indirect

Various elements of costing- concept of estimation for costing, break-even analysis

Total lecture required 10

UNIT V

Economic Viability

Staff organization in textile mills – daily wages, various systems

Recruitment, allocation and skill development

Management and information system MIS

Total lecture required 08

Text Books & Reference Material

1. Industrial Engineering, Organization & management by Tarachand

2. Industrial Economics & Principle of Management by T.M.Chabra

3. Industrial Economics & Principle of Management by S. K Sharma

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BTTT-804:- TECHNICAL TEXTILES

(L T P 3 1 0)

Unit (1): Introduction to technical textile, types of technical textiles, textiles used in industry such as filtration, filter fabric construction- woven, needle felt & knitted filter fabric, finishing treatment of filter fabric, thermal and chemical properties of filter fabric, essential requirements of good filter fabric. Application of nano technology and nano materials for the improved filtration.

Total Lectures required =8

Unit (2): Manufacture and properties of protective textiles- water proof/coated and water repellent, antimicrobial, flame retardant, chemical resistance, Nuclear and biological resistance, mechanical resistance such as bullet proof, cut proof, stab proof

Total Lectures required =9

Unit (3): Medical textiles, fibres used, classification of medical textiles- non-implantable material wound dressings, bandages, plasters, etc, Extra-corporal devices – Artificial kidney, liver lung, implantable material- suture, soft tissue implant, Orthopedic implants, Cardiovascular implants, Healthcare/ hygiene products, medical cost, surgical gown, face mask etc.

Total Lectures required =8

Unit (4): Smart textiles, brief introduction of smart textiles, classification of smart textiles, passive smart textiles, active smart textiles, brief discussion of smart shirt, smart suit, musical jacket, space suit etc. automotive textiles: type cord, seat belt, air bag, seat upholstery, carpets, headliners, helmets etc, Agro textile: Shade net, green house film, Mulch net, crop cover, anti hail and bird protection net, finishing net etc.

Total Lectures required =9

Unit (5): Introduction of geo textile, classification of geo textiles, functions of geo textile-soil reinforcement, drainage (fluid transmission), filtration, separation, erosion control/ absorption, objective of geo textiles, manufacturing of geo textile, essential properties of geo textiles- Mechanical determinants, Hydraulic determinants, durability determinants

Total Lectures required =8

Grand total of lectures required = 42

Text Books and Reference material:

1. Hand book of technical textiles- A.R. Horrocks & S.C.Anand
2. Smart fibre, fabrics and clothing TaoX
3. Shears handbook of industrial Textiles

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PROJECT

SEMINAR

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