1. **Programme Educational Objectives (PEOs)**
Bachelor of Handloom and Textile Technology curriculum is designed to prepare the graduates having attitude and knowledge to

a) Have powerful base to pursue a successful professional and technical career
b) Have strong foundation in basic sciences, mathematics, engineering and experimentation skills to comprehend the manufacturing processes and provide practical and innovative solutions.
c) Have knowledge on the theory and practices in the field of handloom technology, textile technology and allied areas to manage handloom and textile industry and provide techno-economic solutions to the problems.
d) Engross in life-long learning to keep abreast with emerging technology
e) Practice and inspire high ethical values and maintain high technical standards

2. **Programme Outcome (POs)**
1. Ability to apply knowledge of mathematics, science and engineering in handloom and textile production processes and product design.
2. Ability to apply knowledge on fiber, yarn, handloom weaving, advanced fabric manufacture, fabric structure, chemical processing and testing of textiles in the field of handloom and textile manufacture.
3. Ability to apply the knowledge on theory of yarn structure, fabric structure and design concepts on product development
4. Ability to identify and solve technological problems in handloom and textile industry
5. Ability to analyze and apply knowledge in the field of design and production of handloom textile and other textile products using computational platforms and software tools.
6. Commitment to implement the professional and ethical values.
7. Use the techniques, skills, and modern tools necessary for practicing in the handloom and textile industry.
8. Ability to communicate effectively and work in interdisciplinary groups.
9. Ability to review, comprehend and report technological development.

3. **PEOs / POs Mapping**

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**Note:** Internship for a duration of two weeks during the Semester summer vacation should be undergone by the students for which assessment will be done during VII semester.
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*Note: Internship for a duration of two weeks during the Semester summer vacation should be undergone by the students for which assessment will be done during VII semester.*
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* - Course from the curriculum of the other UG Programmes  
** - vide IV semester and VI semester

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**TOTAL CREDITS: 179**

### PROFESSIONAL ELECTIVES (PE)

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### EMPLOYABILITY ENHANCEMENT COURSES (EEC)

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### SUMMARY

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OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I SHARE INFORMATION RELATED TO ONESELF/FAMILY & FRIENDS 12

UNIT II GENERAL READING AND FREE WRITING 12
Reading - comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and /or short questions/ open-ended questions)-inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register- Writing – paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures –Listening- telephonic conversations. Speaking – sharing information of a personal kind—greeting – taking leave- Language development – prepositions, conjunctions Vocabulary development- guessing meanings of words in context.

UNIT III GRAMMAR AND LANGUAGE DEVELOPMENT 12
Reading - short texts and longer passages (close reading) Writing- understanding text structure-use of reference words and discourse markers-coherence-jumbled sentences Listening – listening to longer texts and filling up the table- product description- narratives from different sources. Speaking- asking about routine actions and expressing opinions. Language development- degrees of comparison- pronouns- direct vs indirect questions- Vocabulary development – single word substitutes- adverbs.

UNIT IV READING AND LANGUAGE DEVELOPMENT 12
Reading- comprehension-reading longer texts- reading different types of texts- magazines Writing- letter writing, informal or personal letters-e-mails-conventions of personal email- Listening- listening to dialogues or conversations and completing exercises based on them. Speaking- speaking about oneself- speaking about one’s friend- Language development- Tenses- simple present-simple past- present continuous and past continuous- Vocabulary development- synonyms-antonyms- phrasal verbs

UNIT V EXTENDED WRITING 12
Reading- longer texts- close reading –Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing- Listening – listening to talks- conversations- Speaking – participating in conversations- short group conversations- Language
development-modal verbs- present/ past perfect tense - Vocabulary development-collocations-fixed and semi-fixed expressions

TOTAL : 60 PERIODS

OUTCOMES:
At the end of the course, learners will be able to:

- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
- Comprehend conversations and short talks delivered in English
- Write short essays of a general kind and personal letters and emails in English.

TEXT BOOKS:

REFERENCES

MA8151 ENGINEERING MATHEMATICS – I L T P C
4 0 0 4

OBJECTIVES :
- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

UNIT I DIFFERENTIAL CALCULUS 12
Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12
UNIT III  INTEGRAL CALCULUS  
Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT IV  MULTIPLE INTEGRALS  

UNIT V  DIFFERENTIAL EQUATIONS  

TOTAL : 60 PERIODS

OUTCOMES :  
After completing this course, students should demonstrate competency in the following skills:  
- Use both the limit definition and rules of differentiation to differentiate functions.  
- Apply differentiation to solve maxima and minima problems.  
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.  
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.  
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.  
- Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.  
- Apply various techniques in solving differential equations.

TEXT BOOKS :  
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015. [For Units I & III - Sections 1.1, 2.2, 2.3, 2.5, 2.7(Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1(Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES :  
OBJECTIVES:
- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT I  PROPERTIES OF MATTER  9

UNIT II  WAVES AND FIBER OPTICS  9

UNIT III  THERMAL PHYSICS  9

UNIT IV  QUANTUM PHYSICS  9

UNIT V  CRYSTAL PHYSICS  9
Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

OUTCOMES:
Upon completion of this course,
- the students will gain knowledge on the basics of properties of matter and its applications,
- the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
- the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
• the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
• the students will understand the basics of crystals, their structures and different crystal growth techniques.

TEXT BOOKS:

REFERENCES:

CY8151 ENGINEERING CHEMISTRY L T P C
3 0 0 3

OBJECTIVES:
• To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
• To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
• Preparation, properties and applications of engineering materials.
• Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
• Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

UNIT I WATER AND ITS TREATMENT
9

UNIT II SURFACE CHEMISTRY AND CATALYSIS
9

UNIT III ALLOYS AND PHASE RULE
9
Alloys: Introduction- Definition- properties of alloys- significance of alloying, functions and effect of alloying elements- Nichrome and stainless steel (18/8) – heat treatment of steel. Phase rule:
Introduction, definition of terms with examples, one component system - water system - reduced phase rule - thermal analysis and cooling curves - two component systems - lead-silver system - Pattinson process.

UNIT IV FUELS AND COMBUSTION


UNIT V ENERGY SOURCES AND STORAGE DEVICES

Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor - solar energy conversion - solar cells - wind energy. Batteries, fuel cells and supercapacitors: Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, lithium-ion-battery) fuel cells – \( \text{H}_2-\text{O}_2 \) fuel cell.

OUTCOMES:
- The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

TEXT BOOKS:

REFERENCES:

GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

OBJECTIVES:
- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
• To do input/output with files in Python.

UNIT I ALGORITHMIC PROBLEM SOLVING

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA, EXPRESSIONS, STATEMENTS

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT V FILES, MODULES, PACKAGES

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

OUTCOMES:
Upon completion of the course, students will be able to

• Develop algorithmic solutions to simple computational problems
• Read, write, execute by hand simple Python programs.
• Structure simple Python programs for solving problems.
• Decompose a Python program into functions.
• Represent compound data using Python lists, tuples, dictionaries.
• Read and write data from/to files in Python Programs.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

GE8152 ENGG WRITE HISTORY

OBJECTIVES:
- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREEHAND SKETCHING 7+12
Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE 6+12
Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 5+12
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 5+12
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section.
Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  6+12
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

TOTAL: 90 PERIODS

OUTCOMES:
On successful completion of this course, the student will be able to
- familiarize with the fundamentals and standards of Engineering graphics
- perform freehand sketching of basic geometrical constructions and multiple views of objects.
- project orthographic projections of lines and plane surfaces.
- draw projections and solids and development of surfaces.
- visualize and to project isometric and perspective sections of simple solids.

TEXT BOOK:

REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size. The examination will be conducted in appropriate sessions on the same day.

GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY 0 0 4 2

COURSE OBJECTIVES:
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS
1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton’s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame

PLATFORM NEEDED
Python 3 interpreter for Windows/Linux

OUTCOMES:
Upon completion of the course, students will be able to
- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

TOTAL: 60 PERIODS

BS8161 PHYSICS AND CHEMISTRY LABORATORY L T P C
OBJECTIVES:
- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)
1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young’s modulus by non-uniform bending method
3. (a) Determination of wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of band gap of a semiconductor
8. Determination of thickness of a thin wire – Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- apply principles of elasticity, optics and thermal properties for engineering applications.

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

OBJECTIVES:
- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by viscometry.

1. Estimation of HCl using Na₂CO₃ as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler’s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-
   Phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
12. Pseudo first order kinetics-ester hydrolysis.
14. Determination of CMC.
15. Phase change in a solid.
16. Conductometric titration of strong acid vs strong base.

OUTCOMES:
• The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

TOTAL: 30 PERIODS

TEXTBOOKS:

HS8251 TECHNICAL ENGLISH L T P C
4 0 0 4

OBJECTIVES:
The Course prepares second semester engineering and Technology students to:
• Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
• Foster their ability to write convincing job applications and effective reports.
• Develop their speaking skills to make technical presentations, participate in group discussions.
• Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.

UNIT I INTRODUCTION TECHNICAL ENGLISH 12

UNIT II READING AND STUDY SKILLS 12
Listening- Listening to longer technical talks and completing exercises based on them- Speaking – describing a process- Reading – reading longer technical texts- identifying the various transitions in a text- paragraphing- Writing- interpreting graphs, graphs- Vocabular Development- vocabulary used in formal letters/emails and reports Language Development- impersonal passive voice, numerical adjectives.

UNIT III TECHNICAL WRITING AND GRAMMAR 12
Listening- Listening to classroom lectures/ talks on engineering/technology - Speaking – introduction to technical presentations- Reading – longer texts both general and technical, practice in speed reading; Writing- Describing a process, use of sequence words- Vocabular Development- sequence words- Misspelled words. Language Development- embedded sentences.

UNIT IV REPORT WRITING 12

UNIT V GROUP DISCUSSION AND JOB APPLICATIONS 12
Listening - TED/Ink talks; Speaking - participating in a group discussion; Reading - reading and understanding technical articles; Writing - Writing reports, minutes of a meeting, accident and survey; Vocabulary Development - verbal analogies; Language Development - reported speech.

TOTAL: 60 PERIODS

OUTCOMES: At the end of the course learners will be able to:
- Read technical texts and write area-specific texts effortlessly.
- Listen and comprehend lectures and talks in their area of specialisation successfully.
- Speak appropriately and effectively in varied formal and informal contexts.
- Write reports and winning job applications.

TEXT BOOKS:

REFERENCES
2. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007

Students can be asked to read Tagore, Chetan Bhagat and for supplementary reading.

MA8251 ENGINEERING MATHEMATICS – II

OBJECTIVES:
- This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT I MATRICES
12

UNIT II VECTOR CALCULUS
12
Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved
surface - Volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTIONS
Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions \( w = z + c, \frac{1}{z}, cz, \frac{z^2}{z+1} \) - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION

UNIT V LAPLACE TRANSFORMS

TOTAL: 60 PERIODS

OUTCOMES:
After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
- Gradient, divergence and curl of a vector point function and related identities.
- Evaluation of line, surface and volume integrals using Gauss, Stokes and Green’s theorems and their verification.
- Analytic functions, conformal mapping and complex integration.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS:

REFERENCES:
PH8254  PHYSICS OF MATERIALS  
(Common to courses offered in Faculty of Technology except Fashion Technology)

L T P C  
3 0 0 3

OBJECTIVES:
- To introduce the physics of various materials relevant to different branches of technology

UNIT I  PREPARATION OF MATERIALS  9

UNIT II  CONDUCTING MATERIALS  9

UNIT III  SEMICONDUCTING MATERIALS  9

UNIT IV  DIELECTRIC AND MAGNETIC MATERIALS  9

UNIT V  NEW MATERIALS AND APPLICATIONS  9

OUTCOMES:
At the end of the course, the students will able to
- gain knowledge on phase diagrams and various material processing methods,
- acquire knowledge on basics of conducting materials, superconductors and their applications
- get knowledge on the functioning of semiconducting materials and their applications in LED and solar cells,
• understand the functioning of various dielectric and magnetic materials,
• have the necessary understanding on various advanced materials.

TEXT BOOKS:

REFERENCES

BE8251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVES:
• To explain the basic theorems used in Electrical circuits and the different components and function of electrical machines.
• To explain the fundamentals of semiconductor and applications.
• To explain the principles of digital electronics
• To impart knowledge of communication.

UNIT I ELECTRICAL CIRCUITS & MEASURMENTS

UNIT II ELECTRICAL MACHINES

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS

UNIT IV DIGITAL ELECTRONICS

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING

TOTAL: 45 PERIODS

OUTCOMES:
- ability to identify the electrical components and explain the characteristics of electrical machines.
- ability to identify electronics components and understand the characteristics

TEXT BOOKS:

REFERENCES:

CY8292 CHEMISTRY FOR TECHNOLOGISTS L T P C
3 0 0 3

UNIT I UNIT PROCESSES 9
Nitration, Sulphonation, Halogenation, Esterification, Amination, Saponification and Hydrogenation – Role of the above unit processes in such industries as petroleum, drugs, pharmaceuticals and organic synthesis.

UNIT II REACTION MECHANISMS 9
Free radical, substitutions, electrophilic, addition, aromatic electrophilic substitutions, nucleophilic additions, condensation reactions, nucleophilic substitutions in aliphatic and aromatic compounds, cyclo-additions, rearrangements–Beckmann and Fries rearrangement reactions.

UNIT III OILS, FATS, SOAPS & LUBRICANTS 9
Chemical constitution, Chemical analysis of oils and fats – acid, saponification and iodine values, Definitions, determinations and significance. Definition, mechanism of lubrication, preparation of petrolubes, desirable characteristics – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline point. Semisolid lubricant – greases, preparation of sodium, lithium, calcium and axle greases and uses, consistency test and drop point test. Solid lubricants – graphite and molybdenum disulphide.

UNIT IV CHEMICALS AND AUXILIARIES 9
Preparation, properties and uses of bleaching powder, sodium hypochlorite, hydrogen peroxide, chlorine dioxide. Estimation of available chlorine in hypochlorite bleach liquor. Determination of strength of hydrogen peroxide.

UNIT V COLORANTS 9
Theory of color and constitution: chromophore and auxochrome, classification of dyes based on application. Chemistry and synthesis of azo dye (Methyl red, Methyl orange and Congo red)

**TOTAL: 45 PERIODS**

**TEXTBOOKS:**

**REFERENCES:**

**TT8251**  
**BASICS OF TEXTILE TECHNOLOGY**  
**L T P C**  
**3 0 0 3**

**OBJECTIVES**
- To enable the students to learn about the basics of fibre forming, yarn production, fabric formation, coloration of fabrics and garment manufacturing

**UNIT I**  
**BASICS OF FIBRE SCIENCE AND SPINNING**  
13
Definition of fibre, classification of textile fibers; polymer and polymerization; fibre production principles – wet spinning, dry spinning, melt spinning, gel spinning, dope spinning; characteristics of cotton, viscose, wool, silk, polyester, nylon, polypropylene; sequence of machineries in short staple yarn spinning from ginning to cone winding and their objectives.

**UNIT II**  
**BASICS OF FABRIC PRODUCTION**  
13
Woven fabric – warp, weft, weaving, path of warp; looms – classification, handloom and its parts, powerloom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; basic weaving mechanism - primary, secondary and auxiliary mechanisms; knitting – classification, principle, types of fabrics; nonwoven process – classification, principle, types of fabrics.

**UNIT III**  
**BASICS OF CHEMICAL PROCESSING**  
9
Objectives of the processes - singeing, desizing, scouring, bleaching, mercerization; dyeing-classification of dyes, types of dyeing techniques; printing –types and styles of printing; finishing treatments – chemical and mechanical finishing.

**UNIT IV**  
**BASICS OF GARMENT MANUFACTURING**  
5
Anthropometry, basic principles of pattern making and grading, marker planning, spreading, cutting, sorting, sewing, finishing and packing.

**UNIT V**  
**BASIC FIBRE, YARN AND FABRIC PROPERTIES**  
5
Essential fibre properties - cotton and polyester; yarn numbering systems; essential yarn properties; fabric specifications and essential fabric properties

TOTAL : 45 PERIODS

OUTCOMES:
- The students will have the knowledge on the basics of fibre forming polymers, weaving the yarns into fabric, coloration of the fabrics and manufacturing of garments.

TEXT BOOKS

REFERENCES

GE8261 ENGINEERING PRACTICES LABORATORY

OBJECTIVES:
To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

CIVIL ENGINEERING PRACTICE 13

Buildings:
- (a) Study of plumbing and carpentry components of residential and industrial buildings.
- Safety aspects.

Plumbing Works:
- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:
  - Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
(e) Demonstration of plumbing requirements of high-rise buildings.

**Carpentry using Power Tools only:**  
(a) Study of the joints in roofs, doors, windows and furniture.  
(b) Hands-on-exercise:  
   Wood work, joints by sawing, planing and cutting.

### II 机械工程实践 (MECHANICAL ENGINEERING PRACTICE) 18

**Welding:**  
(a) Preparation of butt joints, lap joints and T-joints by Shielded metal arc welding.  
(b) Gas welding practice

**Basic Machining:**  
(a) Simple Turning and Taper turning  
(b) Drilling Practice

**Sheet Metal Work:**  
(a) Forming & Bending:  
(b) Model making – Trays and funnels.  
(c) Different type of joints.

**Machine assembly practice:**  
(a) Study of centrifugal pump  
(b) Study of air conditioner

**Demonstration on:**  
(a) Smithy operations, upsetting, swaging, setting down and bending. Example –  
   Exercise – Production of hexagonal headed bolt.  
(b) Foundry operations like mould preparation for gear and step cone pulley.  
(c) Fitting – Exercises – Preparation of square fitting and V – fitting models.

**GROUP B (ELECTRICAL & ELECTRONICS)**

### III 电气工程实践 (ELECTRICAL ENGINEERING PRACTICE) 13

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.  
2. Fluorescent lamp wiring.  
3. Stair case wiring  
5. Measurement of energy using single phase energy meter.  

### IV 电子工程实践 (ELECTRONICS ENGINEERING PRACTICE) 16

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.  
2. Study of logic gates AND, OR, EX-OR and NOT.  
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.  
5. Measurement of ripple factor of HWR and FWR.

**TOTAL: 60 PERIODS**

**OUTCOMES:**  
On successful completion of this course, the student will be able to
• fabricate carpentry components and pipe connections including plumbing works.
• use welding equipments to join the structures.
• Carry out the basic machining operations
• Make the models using sheet metal works
• Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
• Carry out basic home electrical works and appliances
• Measure the electrical quantities
• Elaborate on the components, gates, soldering practices.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL
1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets.
2. Carpentry vice (fitted to work bench) 15 Nos.
4. Models of industrial trusses, door joints, furniture joints 5 each
5. Power Tools: (a) Rotary Hammer 2 Nos
   (b) Demolition Hammer 2 Nos
   (c) Circular Saw 2 Nos
   (d) Planer 2 Nos
   (e) Hand Drilling Machine 2 Nos
   (f) Jigsaw 2 Nos

MECHANICAL
1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
8. Power Tool: Angle Grinder 2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner One each.

ELECTRICAL
1. Assorted electrical components for house wiring 15 Sets
2. Electrical measuring instruments 10 Sets
3. Study purpose items: Iron box, fan and regulator, emergency lamp 1 each
4. Megger (250V/500V) 1 No.
5. Power Tools: (a) Range Finder 2 Nos
   (b) Digital Live-wire detector 2 Nos

ELECTRONICS
1. Soldering guns 10 Nos.
2. Assorted electronic components for making circuits 50 Nos.
3. Small PCBs 10 Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply.
OBJECTIVE
To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of nitrite in water, cement, oil, coal, Phenol

LIST OF EXPERIMENTS (Any ten experiments)
1. Determination of Redwood / Saybolt numbers, kinematic viscosity and viscosity index of lubricating oils
2. Determination of flash point, fire point, cloud and pour point of oils
3. Determination of acid value, iodine value of oils and saponification value.
4. Determination of COD of water samples
5. Determination of total, temporary & permanent hardness of water by EDTA method.
6. Estimation of HCl using Na₂CO₃ as primary standard and determination of alkalinity in water sample.
7. Determination of purity of washing soda and strength of a commercial acid
8. Estimation of available chlorine in hypochlorite solution
9. Estimation of strength of hydrogen peroxide
11. Determination of Calorific value using Bomb calorimeter

OUTCOME
- Familiarization with equipment like viscometers, flash and fire point apparatus etc
- Familiarization of methods for determining COD
- Familiarization of a few simple synthetic techniques for soap

TEXT BOOKS
OBJECTIVE:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control.

UNIT I  PROBABILITY AND RANDOM VARIABLES  12

UNIT II  TWO-DIMENSIONAL RANDOM VARIABLES  12
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III  TESTING OF HYPOTHESIS  12
Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample tests based on Normal distribution for single mean and difference of means - Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT IV  DESIGN OF EXPERIMENTS  12
One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design - $2^2$ factorial design.

UNIT V  STATISTICAL QUALITY CONTROL  12
Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL: 60 PERIODS

OUTCOMES:
Upon successful completion of the course, students will be able to:

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- Apply the concept of testing of hypothesis for small and large samples in real life problems.
- Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
- Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

TEXT BOOKS:

REFERENCES:

TT8391 ENGINEERING MECHANICS FOR TEXTILE TECHNOLOGISTS L T P C
3 2 0 4

OBJECTIVE:
- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

UNIT I BASICS AND STATIC OF PARTICLES 15

UNIT II EQUILIBRIUM OF RIGID BODIES 15
Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon’s theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III PROPERTIES OF SURFACES AND SOLIDS 15

UNIT IV DYNAMICS OF BODIES 15
UNIT V  FRICCTION AND ELEMENTS OF RIGID BODY DYNAMICS

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction – wedge friction. Rolling resistance - Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

TOTAL: 75 PERIODS

OUTCOMES:
- Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- Ability to analyse the forces in any structures.
- Ability to solve rigid body subjected to dynamic forces.

TEXT BOOKS:

REFERENCES:

TT8351  CHARACTERISTICS OF TEXTILE FIBRES  L T P C

OBJECTIVES:
To enable the students to understand the

- Structure and morphology of textile fibres
- Physical characteristics textile fibres

UNIT I  STRUCTURE AND MORPHOLOGY
Classification of fibres; study of morphological structures of fibers; physical properties of fibres. order and disorder in fibre structure; molecular conformations – planar zig-zag, helical, lamellar, and sphrulite conformations; Transmission and Scanning electron microscopes-principle; construction and working; X-ray diffraction techniques – estimation of crystallinity; Infrared radiation and dichroism techniques; chemical element and group identification by transmittance and optical density methods, molecular orientation estimation

UNIT II  MOISTURE ABSORPTION CHARACTERISTICS
Theories of moisture sorption; Moisture absorption behavior of natural and man-made fibres; influence of fibre structure, humidity and temperature on the moisture absorption; conditioning of fibres – mechanism of conditioning and factors influencing conditioning. Moisture diffusion in fibres. Heat of sorption – integral and differential, their relation; factors influencing heat of sorption - measurement of heat of sorption

UNIT III  TENSILE CHARACTERISTICS

Tensile characteristics –study of strength, elongation, work of rupture, initial modulus, work factor and yield point – determination of yield point. Stress-strain relations of natural and manmade fibres - influence of fibre structure, humidity and temperature on tensile characteristics. Time effects Study of creep phenomena. Elastic recovery and its relation to stress and strain of fibres; mechanical conditioning of fibres and its influence on elastic recovery. Load cycling and extension cycling-their effect on elastic recovery. Introduction about torsional and flexural rigidity of fibers

UNIT IV OPTICAL AND FRICTIONAL CHARACTERISTICS 6
Reflexion and Lustre-objective and subjective methods of measurement - refractive index and its measurement - birefringence, factors influencing birefringence - Absorption and dichroism Friction – static, limiting and kinetic friction, its measurement, comparison of fibres, directional friction in wool – friction.

UNIT V THERMAL CHARACTERISTICS 6
Thermal transitions of fibres - thermal conductivity, thermal expansion and contraction, Tg, melting; static electricity in textile fibres

TOTAL:60 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to

- Correlate the physical properties of fibre to its microstructure and its influence on other characteristics
- Choose appropriate fibre for the required property

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To expose the students to the numbering system used to specify textile yarns
- To enable the students to understand the processes involved in the production of yarn from fibres
- To enable the students to understand the machinery used for the production of yarns using short staple spinning system

UNIT I  INTRODUCTION TO SPINNING
Sequence of spinning machinery for producing carded, combed and blended yarns in short staple and long staple spinning system; yarn numbering systems- direct, indirect and conversions; influence of characteristics of raw material – fibre fineness, length, strength, elongation, stiffness, fibre friction, cleanliness on spinning performance; spinnability

UNIT II  GINNING AND BLOWROOM MACHINERY
Description and working of different types of gins; selection of right type of gins; ginning performance on yarn quality; objects, principle and description of opening, cleaning and blending machines used in blowroom; chute feed; cleaning efficiency, production calculations.

UNIT III  CARDING MACHINE
Objects and principle of carding; detailed study of flat card; autolevelling; card clothing and its maintenance; drives and production calculation

UNIT IV  COMBER
Objectives of comber preparatory; detailed study of sliver lap, ribbon lap and super lap formers; objects and principles of combing; sequence of combing operation; combing efficiency and production calculation.

UNIT V  DRAWING MACHINE AND ROVING MACHINE
Tasks of drawing machine; drafting systems used in modern drawing machines; autolevelling; draft and production calculation; objectives of roving machine; working of roving machine; bobbin builder mechanism – mechanical and electro-mechanical; draft, twist and production calculations.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Calculate the yarn numbering by different systems
- Understand the processes involved in the production of yarn using short staple spinning system
- Understand the details of machinery used for the production of yarn

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The main objective of this course is to enable the students to understand

- Preparatory processes involved in the production of fabric
- Basics of weaving and knitting processes
- Basics of nonwoven production methods

UNIT I  WINDING  13
Objects of winding; principles of cheese and cone winding machines; drum and precision winding; uniform build of yarn package; types of drums – half accelerated and fully accelerated drums; control of balloons; Classification of yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic clearers; knotters and splicers, weft winding; study of modern automatic winders.

UNIT II  PROCESS CONTROL IN WINDING  5
Faults in wound packages, their causes and remedies; winding synthetic and blended yarns; winding for colouration; quality of knots and splices; winding performance; productivity; maintenance; quality control; material handling.

UNIT III  WARping AND SIZING  18
Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines. Sizing objectives of sizing; sizing materials and recipe used for different types of fibers; size preparation equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and sizing. Control concepts in modern sizing; energy conservation in sizing; Sizing defects and production calculations.

UNIT IV  PROCESS CONTROL IN WARPING AND SIZING  5
Process control in warping (production calculation, machine and labor productivity, control of end breaks, quality and hard waste in warping); Control systems used in sizing machine.

UNIT V  DRAWING- IN  4
Need for drawing-in operation; manual and automatic drawing- in, leasing, knotting and pinning machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends and calculations.
OUTCOMES:
Upon completion of the course, the students will be able to

- Explain the preparatory processes involved in the production of fabrics
- Explain the principles of different fabric production methods
- Identify various fabric defects and their causes and remedies

TEXT BOOKS:

REFERENCES:

HT8301 HANDLOOM WEAVING TECHNOLOGY L T P C
3 0 0 3

OBJECTIVES:
- To enable the students to understand the principles of mechanisms of handloom weavings such as primary, secondary and auxiliary motions, preparatory processes, yarn packages etc,
- To enable the students to perform calculations of yarn count, reed count and heald count
- To enable the students to gain the knowledge of the principles of working of various handloom dobbies

UNIT I 9
Yarn packages - hanks, cones, cheeses, and spools - Characteristics and use; essential characteristic of warp and weft, Objectives of winding and warping, peg warping, vertical warping and sectional warping; objectives and importance of sizing of cotton yarn, ingredients used in size mixture for handloom industry and their functions, various forms of sizing- hank sizing and street warp sizing; Characteristics of ideal sizing, common defects during sizing- causes and remedies.

UNIT II 9
Evolution of handlooms, Various parts of a handloom and their functions, types of handlooms- Throw shuttle handloom, Fly shuttle pit loom and frame loom; Relationship between type of handloom and the product, passage of warp in frame loom; motions of a handloom; definitions of primary, secondary & auxiliary, motions; Types of shed formations– centre closed shed, bottom closed shed, top closed shed, open shed and semi open shed - advantages, disadvantages and shedding devices; shedding mechanism of a handloom using treads and heald reversing motions – roller system, pulley reversing system and jack and lam rod system
UNIT III
Picking mechanism of a handloom, types of shuttles – throw shuttle, fly shuttle and roller shuttle, design and suitability; beat-up- open shed beat-up, closed shed beat up and crossed shed beat-up in handlooms, different types of reed – bamboo reed, steel reed and all metal steel reed, suitability for various fabrics; let off motion in handlooms – ratchet wheel and pawl, rope and weight, rope-lever and weight motions; take up motion in handloom – poker rod, ratchet wheel & pawl; auxiliary motions of a handloom – temple motion and terry motion; handloom dobbies – lattice dobbys, barrel dobbys and vertical dobbys.

UNIT IV
Introduction to numbering of yarns; indirect system of numbering of yarns – New English cotton, New French, metric, worsted, Woolen Yorkshire Skein, linen, spun yarn, Direct system of numbering of yarns – Denier metric, flax/ jute/ hemp, Universal system of yarn numbering – Tex and its derivatives - Millitex, Kilotex; Determination of conversion factors, Conversion of count of yarn - indirect to indirect, direct to direct, indirect to direct, direct to indirect systems.

UNIT V
Determination of Equivalent/Resultant count of folded yarns with and without contraction during twisting, Costing of folded yarn, Average count of warp. Read Count - dents per linear space and groups of dents per linear space models, Stockport System of Reed count - relation between reed count, number of ends per dent, ends per inch, cloth width, reed width and total number of ends, heald count calculations.

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of the syllabus, the students will get knowledge on all mechanisms of different types of handlooms. They will be able to perform the calculations of various yarn numbering systems.

TEXT BOOKS:

REFERENCES:

TT8361 FIBRE SCIENCE LABORATORY

OBJECTIVES:
To enable the students to understand the
- Identification of fibres by different methods
- Method of characterization of fibres

LIST OF EXPERIMENTS
1. Identification of fibres by feel, microscopic view, burning behavior and solubility
   - Natural cellulose fibres
• Natural protein fibres
• Regenerated cellulose fibres
• Polyamide fibres
• Polyester fibres
• Polyolefin fibres

2. Determination of density of various fibres by density gradient column
3. Determination of denier of synthetic fibres by gravimetric method
4. Determination of Moisture Regain and Moisture content of fibres
5. Determination of the percentage of spin finish of synthetic fibres
6. Determination of wax content of the cotton fibres
7. Determination of the blend proportion
   • Natural/ regenerated cellulose
   • Cellulose/ protein fibres
   • Cellulose/polyester fibres
   • Natural cellulose/ regenerated cellulose/polyester
8. Thermo gravimetric analysis of fibres using thermograms
9. FTIR analysis of polymers and fibres from spectrum

TOTAL: 30 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to

• Identify the given fibres using cross section, dissolution in solvent and burn test practically.
• Determine important properties of fibres
• Determine blend proportion of different fibres in a blended material

LABORATORY EQUIPMENT
LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
1. Microscope – 1 No.
2. Weighing balance – 1 No.
3. Conditioning Chamber – 1 No.

HT8311 HANDLOOM WEAVING LABORATORY

OBJECTIVES:
• The student shall study different technical aspects of handloom weaving.
• They shall be able develop fabric sample as per the required specifications

LIST OF EXPERIMENTS:
1. Drawing sketches of different parts of handlooms with specifications and joining threads by piecing and knotting
2. Study of drawing–in, denting and gaiting up
3. Study of winding of yarn on double flanged bobbins and pirns using charka
4. Study of warping on peg warping frame
5. Study of warping on sectional warping machine
6. Study of weave, peg/tie-up plan and loom setting on multi treadle frame loom
7. Development of fabric samples using Plain and its derivatives
8. Development of fabric samples using twill weave and its derivatives
10. Development of fabric samples using Honey Comb weave

TOTAL: 30 PERIODS

OUTCOMES:
- Student will get through knowledge on different technical aspects of handloom weaving.
- They will be capable of producing the fabrics samples as per the required specifications

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

2. Warping machine – 1 No.
3. Handlooms – 10 Nos.
5. Double flanged bobbins – 120 Nos.

HS8381 INTERPERSONAL SKILLS/LISTENING AND SPEAKING

OBJECTIVES: The Course will enable learners to:
- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- Improve general and academic listening skills
- Make effective presentations.

UNIT I
Listening as a key skill- its importance- speaking - give personal information - ask for personal information - express ability - enquire about ability - ask for clarification Improving pronunciation - pronunciation basics taking lecture notes - preparing to listen to a lecture - articulate a complete idea as opposed to producing fragmented utterances.

UNIT II
Listen to a process information- give information, as part of a simple explanation - conversation starters: small talk - stressing syllables and speaking clearly - intonation patterns - compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.

UNIT III
Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk - greet - respond to greetings - describe health and symptoms - invite and offer - accept - decline - take leave - listen for and follow the gist- listen for detail

UNIT IV
Being an active listener: giving verbal and non-verbal feedback - participating in a group discussion - summarizing academic readings and lectures conversational speech listening to and participating in conversations - persuade.

UNIT V
Formal and informal talk - listen to follow and respond to explanations, directions and instructions in academic and business contexts - strategies for presentations and interactive communication - group/pair presentations - negotiate disagreement in group work.

TOTAL: 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

TEXT BOOKS:

REFERENCES:

TT8452 SOLID MECHANICS FOR TEXTILE TECHNOLOGISTS L T P C 3 0 0 3

OBJECTIVE:
- To teach the students on design of support column, beams, pipelines, storage tanks and reaction columns and tanks after undergoing this course. This is precursor for the study on process equipment design and drawing.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

UNIT II TRANSVERSE LOADING ON BEAMS 9

UNIT III DEFLECTIONS OF BEAMS 9
Double integration method – Macaulay’s method – Area – moment theorems for computation of slopes and deflections in beams.
UNIT IV  STRESSES IN BEAMS

UNIT V  TORSION
Torsion of circular shafts – derivation of torsion equation \( (T/J = fs/R = C\theta/L) \) – stress and deformation in circular and hollow shafts – stepped shafts – shafts fixed at both ends – stresses in helical springs – deflection of springs – spring constant.

TOTAL: 45 PERIODS

OUTCOME:
- Upon completion of the program the student will be able to design the support columns, beams in a textile industrial point of view. And also they can overcome defects in the existing construction.

TEXT BOOKS:

REFERENCE:

TT8451  PRODUCTION OF MANUFACTURED FIBRE  L T P C
3 0 0 3

OBJECTIVES:
- To enable the students to learn about the polymer rheology and the laws, and various spinning techniques of polymers
- To expose the students to advances in the spinning process

UNIT I  POLYMER RHEOLOGY
Transport Phenomena in Fibre Manufacturing- Heat and mass; Polymer rheology-Newtonian and non-newtonian fluids, factors affecting shear viscosity; conditions of fibre forming polymers; Melt instabilities.

UNIT II  MELT SPINNING
Melt Spinning- Polymer Selection and Preparation, equipment, properties and applications of polyester, polyamide and polypropylene fibers.

UNIT III  SOLUTION SPINNING
Solution spinning- Polymer Selection and Preparation, equipment, properties and applications of acrylic, polyurethane and regenerated cellulose fibres.

UNIT IV  POST SPINNING OPERATIONS
Neck drawing, drawing systems, influence of drawing on structure and properties of fibres; Types of heat setting, influencing parameters on heat setting, influence of heat setting on fibre behavior; Spin finish composition and application; texturising.

UNIT V DEVELOPMENTS IN FIBER SPINNING
9
Liquid crystal spinning; Gel spinning; Profile fibres, hollow & porous fibres; Speciality fibres polyglycolic acid, polylactic acid, chitosan fibres preparation properties and applications.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to understand
- Polymer rheology and the laws
- Various spinning techniques of polymers parameter involved in spinning synthetic yarn
- Need of various post spinning operations
- Advances in the spinning process

TEXT BOOKS:

REFERENCES:

TT8453 TECHNOLOGY OF YARN SPINNING L T P C
3 0 0 3

OBJECTIVES:
- To expose the students to the numbering system used to specify textile yarns
- To enable the students to understand the processes involved in the production of yarn from fibres
- To enable the students to understand the machinery used for the production of yarns using short staple spinning system

UNIT I RING SPINNING 13
Principle of yarn formation in ring spinning machines; working of ring spinning machine; cop building; design features of important elements used in ring spinning machine; draft, twist and production calculations in ring spinning machine; end breakage rate – causes and remedies

UNIT II CONDENSED YARN SPINNING 5
Condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III YARN PLYING 9
Merits of plying of yarns; methods followed for plying – TFO, ring twisting; selection of twist level for plying; calculation of resultant count of plied yarns; types of fancy yarns, method of production

UNIT IV  ROTOR SPINNING  9
Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; properties of rotor yarn

UNIT V  OTHER SPINNING SYSTEMS  9
Friction, air jet and air vortex spinning methods – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, core, wrap, integrated compound spinning systems.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to

- Calculate the yarn numbering by different systems
- Understand the processes involved in the production of yarn using short staple spinning system
- Understand the details of machinery used for the production of yarn

TEXT BOOKS:

REFERENCES:
2. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999

TT8454  WOVEN FABRIC MANUFACTURE  L T P C
4 0 0 4

OBJECTIVE:
- To enable the students to understand the preparation for weaving and various functions of weaving machine

UNIT I  INTRODUCTION TO WEAVING  6
Yarns quality requirements for high speed automatic shuttle looms and shuttle less loom; warp and weft preparation for high speed looms; Principle of weaving, passage of material, motions in loom – primary, secondary and auxiliary motions, plain power loom driving, timing of motions.

UNIT II  SHEDDING MOTIONS  12
Shed geometry and shedding requirement. Types of shed. Shedding mechanisms - positive and negative. Principles of tappet, dobbby and jacquard shedding mechanisms, reversing mechanisms-limitations of various shedding mechanisms; Conventional and modern dobbby and jacquard mechanism.

UNIT III WEFT INSERTION AND BEAT UP 18
Shuttle picking and checking mechanisms, shuttle flight and timing; Weft feeder – types, Principles of weft insertions in shuttle less looms; mechanism of weft insertion by projectile, rapier loom and jet – air and water. Multi-Phase weaving systems; Kinematics of sley, sley eccentricity; beat up mechanism in modern looms;

UNIT IV SECONDARY AND AUXILIARY MOTIONS 12
Take up and let - off motions used in plain power looms; cloth formation, weaving condition - factors and control; warp protector and warp and weft stop motion; plain power loom accessories. Automatic weft replenishment in shuttle looms – piri changing and shuttle changing looms; mechanisms involved in automatic piri changing – feelers, cutters, design of shuttle, three try motions; multi shuttle looms- box changing principle, Automatic piri changing in multi shuttle loom. Weft arrival control and automation in shuttle less looms; selvedges in shuttle less looms; quick style change;

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESSES 12
Techno economics of shuttle less loom weft insertion systems; loom monitoring and control Loom stoppages and efficiency; fabric defects and value loss; fabric shrinkage in the loom - causes and control; fabric engineering. Filament weaving – Silk & Texturised yarns. Principles and mechanisms in weaving Pile fabrics, tapes and triaxial fabrics

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of this course, the student shall
- Understand the concepts of preparation of yarn for weaving
- Understand different motions of loom in fabric formation

TEXT BOOKS:

REFERENCES:
HT8401  FABRIC STRUCTURE I  L T P C

3 0 0 3

OBJECTIVES:

- To enable the students to understand the construction of woven fabric and weaves.
- To enable them to construct weaves for woven fabrics as per the requirement of consumers

UNIT I
Classification of textile fabrics; classification of woven fabrics - simple, compound and complex; fundamental aspects of woven fabrics - count of graph paper, factors influencing the selection of appropriate count of graph paper, graphical representation of structure of a woven fabric - warp way and weft way; study of plain weave, ornamentation of plain weaves; study of derivative structures of plain weave - regular and irregular warp rib, weft rib, hopsack weaves. Catch-cord technique for weaving warp rib and hop-sack; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT II
Study of twill weaves up to 12 threads, classification of twills - warp faced twill, weft faced twill and equal faced twill; angle of inclination of twill diagonals, influence of the twist direction of yarn over prominence of twill lines; study of derivatives of twill weaves - wavy twill, herringbone, transposed twill, broken twill and curved twill, elongated twill, combined twill, shaded twill and figured twill; diamond, diaper; regular and irregular sateen and satin up to 12 threads, dice check using twill and satin weaves; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT III
Study of honey comb weaves - Ordinary honey comb and Brighton honey comb – cell formation; study of Huck-a-Back, mock leno and corkscrew weaves. Crepe weaves – construction upon sateen base, by combination of floating weaves with plain thread, by reversing and by insertion of one weave over another; design, draft, and peg/tie-up plan and thread interlacing diagram of above weaves. Colour and weave effect - simple colour and weave effect, continuous line effects, hound’s tooth patterns, bird’s eye and spot effects, hairline stripes, step patterns, and all over effects; combination of weaves – twill and plain, mock leno and plain, honey comb and plain, stripe and check effect by these combinations; distorted thread effects – salient feature, warp and weft distortion.

UNIT IV
Bedford cord weaves – salient features, plain faced Bedford cord (regular and alternate pick principle), twill faced bed ford cord, wadded bed ford cord, and crepon Bedford cords; welt structures – salient features and manufacturing techniques, ordinary welts, wadded welts (loose back and fast back); design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT V
Backed cloths- warp & weft backed cloths using twill, sateen and satin.; weft wadded warp backed cloth, reversible and non-reversible fabrics using twill, satin and sateen, weft backed cloth - reversible and non-reversible weft backed cloth using twill, satin and sateen, warp wadded weft backed cloth – reversible and non-reversible fabrics using twill, satin and sateen - Imitation backed cloth, imitation warp and weft backed cloths; design, draft, denting, peg/tie-up and thread interlacing diagram of above weaves.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to
- Understand different classification of woven fabrics.
- Construct basic weaves, draft and peg plan.
- Design fabric structures for different and uses.

TEXT BOOKS:

REFERENCES:

HT8411 TEXTILE DESIGN AND COLOUR LABORATORY

OBJECTIVES:
- The students shall acquire knowledge on the principles of textiles designing.
- The enable the students to prepare textile designs with required colour combinations

LIST OF EXPERIMENTS
1. Drawing of lines, horizontal lines, curved lines, lines of growth and grace, thick and thin lines, double lines, broken lines, oblique lines or lines of movement, accented lines.
2. Free hand drawing practice - creation of foliage drawing, small plants and flowers, creepers, birds, animals, clouds and still water.
3. Light and Pigment theory of colours, properties of colour vision, complementary colours, chromatic circle, attributes of colour, properties of colour – hue, value and intensity, simultaneous contrast – contrast of tone and colour harmony.
5. Drawing of special illusion colour contrasts – mono chromatic contrast and polychromatic contrast.
6. Free hand drawing of elements of textile design – motif, unit figure and design repeat.
7. Creation of textile designs on various bases - rectangular, diamond, ogee, diagonal bases; distribution of unit figures – principles of simple drop and drop reverse; sateen distribution, all over effects etc.
8. Creation of layout for saree, dhoti, lungi and shawl
9. Creation of layout for bed sheet, table cover and handloom durries
10. Documentation of traditional Indian handloom sarees. (pictures/ samples)

TOTAL: 60 PERIODS

OUT COMES:
- Upon completion of the syllabus, the students will be able to draw designs for different varieties of fabric with colour combination and shall have documentation of Indian textiles.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS
1. Drawing Table and Chair – 15 Nos.

HT8412  YARN MANUFACTURE LABORATORY L T P C
0 0 4 2

OBJECTIVES:
- To enable the students to learn technology of yarn manufacturing
- To enable the students to handle spinning machines for effective operation

LIST OF EXPERIMENTS:
1. Construction details of Ginning machine, material passage and ginning out turn calculations
2. Construction details of blowroom machine, material passage and production calculations
3. Construction details of carding machine, material passage and production calculations
4. Wire point specifications and various settings in a carding machine
5. Construction details of drawing machine, material passage, draft and production calculations
6. Construction details of roving machine, material passage, draft and production calculations
7. Study of bobbin builder mechanism in roving machine. To calculate draft, twist and stretch variation between front and back row. To determine count variation within bobbin
8. Construction details of Ring spinning machine, material passage, draft and production calculations
9. Study of bobbin builder mechanism in ring spinning machine. To calculate draft and twist. To determine twist variation between empty to full bobbin
10. Construction details of rotor spinning machine, material passage, draft and production calculations
11. Production of card sliver, draw frame sliver and roving
12. Production of yarn using ring spinning and rotor spinning machines

TOTAL: 60 PERIODS

OUTCOME:
- Upon completion of this practical course, the student will be able to manufacture yarn using the sequence of ginning, blowroom, carding, drawing and spinning.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
- Ginning machine – 1 No.
- Blow room line – 1 No.
- Carding machine – 1 No.
- Drawframe – 1 No.
- Comber – 1 No.
- Speedframe – 1 No.
- Ringframe – 1 No.
- Rotor spinning machine – 1 No.
OBJECTIVE:
- To train the students on different mechanisms of plain loom and circular knitting machines

LIST OF EXPERIMENTS
1. Analysis of Yarn faults
2. Control of production, package density, yarn faults in cone / cheese winding machine
3. Determination of depth of shed and heald shaft movements in tappet shedding mechanism
4. Preparation of pattern card for dobby shedding mechanism and way in which adjust the depth of shed
5. Study of jacquard shedding mechanism
6. Study of picking mechanisms in looms
7. Study of let-off mechanisms
8. Determination of pick space through 5 and 7 wheel take-up mechanisms
9. Study of weft replenishment mechanism in shuttle looms
10. Method of achieving the required colour patterns in 4 X 1 drop box motion
11. Study of warp protector mechanism

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of this practical course, the students shall be able to
- Understand the material passage in the machine, draw gearing diagram, identify the components of spinning and weaving machines
- Calculate draft, twist and production rate of spinning machines
- Understand the mechanism of weaving machine

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
- Cone / Cheese winding machine – 1 No.
- Pirn winding machine – 1 No.
- Sizing chemicals (Consumables) Quantity as per the requirements
- Loom with tappet shedding – 1 No.
- Loom with dobby shedding – 1 No.
- Loom with jacquard – 1 No.
- Loom with dropbox – 1 No.
- Shuttleless loom – 1 No.
• Strengthen the reading skills of students of engineering.
• Enhance their writing skills with specific reference to technical writing.
• Develop students’ critical thinking skills.
• Provide more opportunities to develop their project and proposal writing skills.

UNIT I
Reading - Strategies for effective reading- Use glosses and footnotes to aid reading comprehension- Read and recognize different text types- Predicting content using photos and title
Writing- Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence – Write a descriptive paragraph

UNIT II
Reading- Read for details- Use of graphic organizers to review and aid comprehension Writing- State reasons and examples to support ideas in writing- Write a paragraph with reasons and examples- Write an opinion paragraph

UNIT III
Reading- Understanding pronoun reference and use of connectors in a passage- speed reading techniques- Writing- Elements of a good essay- Types of essays- descriptive-narrative- issue-based-argumentative-analytical.

UNIT IV
Reading- Genre and Organization of Ideas- Writing- Email writing- visumes – Job application- project writing-writing convincing proposals.

UNIT V
Reading- Critical reading and thinking- understanding how the text positions the reader- identify Writing- Statement of Purpose- letter of recommendation- Vision statement

TOTAL: 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:
• Write different types of essays.
• Write winning job applications.
• Read and evaluate texts critically.
• Display critical thinking in various professional contexts.

TEXT BOOKS:

REFERENCES:
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well...
OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10
Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land
degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT


UNIT V HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45 PERIODS

OUTCOMES:

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

TEXT BOOKS:


REFERENCES:

• To enable the students to understand the construction of double layer and pile fabrics and its production techniques.

UNIT I

Double cloth classification – Step by step construction of self-stitched double cloth, reversible and non-reversible varieties using twill and sateen; Centre stitched double cloth; double width plain cloth – interlacement diagram and its graphical representation; plain Tubular cloth – interlacement diagram and its graphical representation; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT II

Thread interchanging double cloth, warp thread interchanging double cloth and weft thread interchanging double cloth, Cloth interchanging double cloth using plain and twill, creation of column stripes, row stripes and check effects using warp and weft patterning; wadded double cloth – warp wadding and weft wadding; Treble width plain cloth – interlacement diagram and its graphical representation; Treble cloth using twill, satin, and sateen; Backed cloths – Salient features, Warp and weft backed cloths - Reversible and non-reversible warp backed cloth using twill and sateen; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT III

Pile fabrics – Salient features, classification of pile fabrics, Terry piles – salient features, terry mechanism; classification of terry pile structures – 3 pick, 4 pick, 5 pick and 6 pick terry, graphical representation and thread interlacement diagram; terry pile on one side of fabric and on both sides, stripe and check effects – terry pile on one side and both sides; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT IV

Velvet - Warp pile fabrics produced with the aid of wires, loop piles and cut piles production techniques – simultaneous insertion of pick and wire and the twin shed formation technique; techniques of anchoring of piles using two beams for ground ends and by using ‘W’ binding; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves. Velveteen – salient features, manufacturing technique and processes involved; All over velveteen – Plain back and Twill back velveteen, Corduroys; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT V

Distorted thread structures, Leno and gauze fabrics – Salient features, open, crossed and plain sheds in leno weaving; Bottom douping and Top douping, Easer and shaker device; thread interchanging diagram of leno structures, Combination of Leno, plain and twill weaves – Russian Cord – Net leno -drafting and lifting plans. Study of traditional handloom fabrics of India – Kancheepuram sarees, Banaras sarees and brocades, Jamdhani, Paithani, Himroo, Chanderi, Patola and Pochampalli sarees.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to

• Understand about the layers of fabrics, piles and its construction.

• Construct weave, draft, peg plan and other weaving techniques for the production of multi-layer and pile fabrics.

TEXT BOOKS:

REFERENCES:

**TT8552 QUALITY EVALUATION OF FIBRES AND YARNS**

**OBJECTIVE:**
- To make the students understand the principle and method of working of equipments used for testing of fibres and yarns

**UNIT I**
**INTRODUCTION**
definition of quality- importance of quality assessment- selection of samples for quality assessment – random and biased samples – squaring technique and zoning technique for fibre selection; yarn sampling - use of random numbers - sampling for various types of yarn tests.

**UNIT II**
**FIBRE LENGTH AND STRENGTH ANALYSIS**
Fibre testing, the fibre quality index and spinnability; Fibre length and length uniformity measuring techniques. Strength Tensile Testing modes – CRT, CRE, CRL and ARL; Fibre strength, importance, relation to yarn strength; Measurement techniques.

**UNIT III**
**FIBRE FINENESS, MATURITY AND TRASH ANALYSIS**

**UNIT IV**
**YARN COUNT, TWIST AND STRENGTH**
Yarn numbering systems-Indirect and direct systems-count conversions; Count measuring systems. Twist in single and ply yarns –twist direction – twist factor – twist and yarn strength; twist measurement and breaking twist angle measurement. Single yarn strength; Lea count strength product (CSP) and Corrected Count Strength Product (CCSP).

**UNIT V**
**YARN MASS EVENNESS AND SURFACE QUALITY**

**OUTCOMES:**
Upon completion of this course, the student shall be able to
- Understand the principle of operation of equipments used for testing fibres and yarns
• Apply knowledge gained through this course, while operating the equipments
• Analyze and interpret the results obtained from quality evaluating systems of fibre and yarns

**TEXT BOOKS:**

**REFERENCES:**

**TT8551 CHEMICAL PROCESSING OF TEXTILE MATERIALS I**

**OBJECTIVE:**
• To enable the students to learn about chemical structure of fibres, pre-treatments involved in the wet processing of textiles and finishing treatment of textile fabrics

**UNIT I**
Chemical structure of fibres; action of chemicals on fibres; natural and added impurities in textiles; singeing and desizing of natural and synthetic fibres and its blends; heat setting.

**UNIT II**
Scouring, bleaching and mercerization of cotton, bio-scouring of cotton; carbonization, scouring and bleaching of wool; degumming of silk

**UNIT III**
Loose stock machine; hank and package processing machines; yarn singeing machine; woven and knitted fabric singeing machines; stretching devices; shearing and raising machines; kiers; mangles; jigger; winch; jet and soft flow machines; yarn mercerizer, chain and chainless mercerizers; continuous scouring and bleaching machines; washing ranges, hydro extractors; detwisters; dryers; stenters

**UNIT IV**
Calendering, crease proofing, shrink proofing and softening; wool finishing.

**UNIT V**
Water and oil repellent finishes; fire retardant finish; antibacterial finish; Application of Nanotechnology in finishing; assessment of finishes; safety measures to be taken at the textile chemical processing industry.

**TOTAL: 45 PERIODS**

**OUTCOMES:**
Upon completion of this course, the student shall have the knowledge of
• Chemical structure of the fibres
• Necessity and requirements of pretreatments in wet processing of textiles
• Various finishing treatments done on fabric

**TEXT BOOKS:**

REFERENCES:

HT8511 FIBRE AND YARN QUALITY EVALUATION LABORATORY L T P C 0 0 4 2

OBJECTIVE:
- To enable the students to test the fibres and yarns and determine important properties.

LIST OF EXPERIMENTS
Determination of
1. Fibre fineness
2. Fibre length
3. Fibre maturity
4. Fibre trash content
5. Fibre bundle strength
6. Roving, sliver and yarn linear density
7. Single yarn strength
8. Lea strength of yarn
9. Single and folded yarn twist
10. Yarn impact strength
11. Unevenness of yarn
12. Yarn appearance

TOTAL: 60 PERIODS

OUTCOMES:
After the completion this practical course, the students will be able to
- Evaluate fiber and yarn characteristics using different equipments
- Analyse the results generated from these equipments
- Apply statistical techniques for better explanation
LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

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<thead>
<tr>
<th>S. No.</th>
<th>Description of Equipment</th>
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<tr>
<td>1.</td>
<td>Baer Sorter</td>
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<td>2.</td>
<td>Fibre Bundle strength tester</td>
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<td>3.</td>
<td>Fibre Fineness tester</td>
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<td>4.</td>
<td>Trash Analyser</td>
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<td>Projection Microscope</td>
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<td>Nep Count Template</td>
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<td>7.</td>
<td>Wrap Reel</td>
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<td>8.</td>
<td>Wrap Block</td>
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<td>9.</td>
<td>Yarn Twist Tester</td>
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<td>Single Yarn Strength Tester</td>
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<td>11.</td>
<td>Bundle yarn strength tester</td>
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<td>12.</td>
<td>Ballistic Tester</td>
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<td>13.</td>
<td>Yarn Unevenness tester</td>
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<td>14.</td>
<td>Yarn abrasion tester</td>
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<td>15.</td>
<td>Weighing balance</td>
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<td>16.</td>
<td>Yarn appearance Board Winder</td>
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<td>17.</td>
<td>Yarn appearance Board (Standards)</td>
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OBJECTIVE:

- To enable the student to gain knowledge in quantitative analysis, pre-treatment and dyeing of textile materials.

1. Identification of textile fibers by burning and microscopic tests, and their confirmation with solubility test.
2. Analysis of given blended samples to determine the blend percentage (P/V,P/C)
4. Desizing of cotton fabrics
5. Hypochlorite bleaching of cotton yarn /fabric
6. Peroxide bleaching of cotton yarn /fabric
7. Dyeing of cotton yarn using cold brand reactive dyes
8. Dyeing of cotton yarn using Hot brand reactive dyes
9. Dyeing of cotton yarn using Vat dyes
10. Degumming and bleaching of silk yarn
11. Dyeing of silk yarn with acid dyes / Reactive dyes
12. Dyeing of Woolen yarn with Metal Complex Dyes
13. Dyeing of polyester yarn using Disperse dye
14. Determination of wash, light, rubbing fastness of dyed yarn/fabrics

OUTCOME:

- Upon completing this practical course, the student would be able to desize, scour and bleach cotton yarn / fabric and dye different yarn / fabric with different types of colourants.

TOTAL: 60 PERIODS
LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Microscope - 1 No.
2. Stainless vats (500 ml each) - 30 Nos.
3. Water bath - 5 Nos.
4. Thermometers - 5 Nos.
5. HTHP Beaker dyeing machine - 1 No.
7. Light Fastness tester - 1 No.
8. Laundro meter - 1 No.
9. Crock meter - 1 No.

HT8513 FABRIC STRUCTURE LABORATORY I

OBJECTIVES:
- To enable the student to analyse the given fabric sample to extract the weave and construction details
- To enable the students to furnish the data required for reproduction of fabric including costing

LIST OF EXPERIMENTS
1. Analysis of weave and construction details of fabrics with plain weave
2. Analysis of weave and construction details of fabrics with rib/mat weaves
3. Analysis of weave and construction details of fabrics with twill/wavy twill weaves
4. Analysis of weave and construction details of fabrics with herringbone/diamond/diaper
5. Analysis of weave and construction details of fabrics with sateen and satin weaves
6. Analysis of weave and construction details of fabrics with crepe weaves
7. Analysis of weave and construction details of fabrics with honeycomb, huck-a-back and mock-leno weaves
8. Analysis of weave and construction details of fabrics with double cloth
9. Analysis of weave and construction details of fabrics with terry weave
10. Analysis of weave and construction details of fabrics with bedford cord weaves
11. Costing of woven fabrics

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the syllabus, the students will be able to draw designs for different varieties of fabric with colour combination and
- Analysis the weave, draft and peg plan of the fabric
- Extract the quality particular of fabric for its reproduction
- Calculate the quantity of yarn requirement for warp and weft
- Calculate the cost of fabric

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

1. Lab Desks - 20 Nos.
2. Beesley’s balance - 5 Nos.
3. Crimp tester - 5 Nos.
5. GSM Cutter - 2 Nos.
OBJECTIVES:
The course aims to:
- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully

UNIT I
Introduction to Soft Skills— Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II
Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III
Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic — questioning and clarifying –GD strategies- activities to improve GD skills

UNIT IV
Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

UNIT V
Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

TOTAL: 30 PERIODS

OUTCOMES:
At the end of the course Learners will be able to:
- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

Recommended Software
1. Open Source Software
2. Win English

REFERENCES:
OBJECTIVE:

- To enable the students to understand the theory of dyeing and printing of woven fabrics, knitted fabrics and garments

UNIT I COLOUR SCIENCE 9
Theories of colour measurement, Beer–Lambert’s law and Kubelka-Munk theory and their application in colour assessment and colour matching; whiteness and yellowness indices.

UNIT II THEORY OF DYEING 9
Dyeing equilibrium; dye-fibre interaction; adsorption isotherm; dye affinity; heat of dyeing; half dyeing time.

UNIT III DYEING 13
Basic characteristics of dyes and pigments; classification of dyes and principle of application of dyes; Chemistry and technology of application of direct, reactive, disperse, acid and basic dyes; processing of denims; determination of fastness properties.

UNIT IV PRINTING 9
Methods and styles of printing; printing machines; constituents of printing paste; printing with direct, reactive, acid and disperse dyes; printing with pigments

UNIT V KNITS AND GARMENTS 5
Dimensional stabilization of tubular and open width knits; garment dyeing and printing; garment

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the student will have knowledge on

- Colour, perception of colour
- Different class of dyes and ways of coloration
- Knit and garment processing
- Need of various finishes to the fabric.

TEXT BOOKS:

REFERENCES:

TT8652  FABRIC AND GARMENT QUALITY EVALUATION  L T P C
          3 0 0 3

OBJECTIVE:
• To enable the students to learn about the construction of fabrics and evaluation of fabric properties and their importance

UNIT I  CONSTRUCTION CHARACTERISTICS  9
Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, determination of the type of weave, measurement of length, width, thickness and Area density (GSM); warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor calculations; Fabric sampling techniques.

UNIT II  STRENGTH CHARACTERISTICS  9

UNIT III  COMFORT AND SURFACE CHARACTERISTICS  9
Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, contact angle and fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

UNIT IV  SPECIAL CHARACTERISTICS  5
Fabric bending hysteresis testing; Shear hysteresis measurements; Fabric compression and decompression behaviour; Fabric surface roughness and friction measurements; Fabric tensile hysteresis measurements; Fabric flame resistance testing methods; Moisture and thermal characteristics.

UNIT V  FABRIC INSPECTION AND GARMENT QUALITY  13

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, students would be able to
• Evaluate the constructional parameters of fabrics
- Understand the principle of measurement of fabric characteristics
- Analyze the various reports generated during quality evaluation of fabric
- Understand the evaluation of garment quality

**TEXT BOOKS:**

**REFERENCES:**

**TT8653 GARMENT MANUFACTURING TECHNOLOGY**

**OBJECTIVES:**
- To enable the students to understand the basics of garment manufacturing, pattern making & sewing and garment wet processing
- To expose the students to various problems & remedies during garment manufacturing & processing

**UNIT I** 18
Anthropometry, mass-production, mass-customization; pattern making, grading, marker planning, spreading & cutting

**UNIT II** 18
Different types of seams and stitches; single needle lock stitch machine - mechanism and accessories; needle – functions, special needles, needle size, numbering, needlepoint; sewing thread construction, material, thread size, packages.

**UNIT III** 6
Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

**UNIT IV** 12
Raw material, in process and final inspection; needle cutting; sewability of fabrics; strength properties of apparel; dimensional changes in apparel due to laundering, dry-cleaning, steaming and pressing; care labeling of apparel

**UNIT V** 6
Garment dyeing, printing and finishing; pressing categories and equipment, packing

**OUTCOMES:**
Upon completion of the course, the students will
- Know about pattern making, market planning, cutting and sewing of apparels
- Know about dyeing and finishing of garments

**TEXT BOOKS:**

**REFERENCES:**

**HT8611 FABRIC QUALITY EVALUATION LABORATORY**

**OBJECTIVE:**
- To make the students practically learn various fabric evaluation procedures to determine characteristics of fabric

**LIST OF EXPERIMENTS**
**Determination of**
1. Fabric tensile strength
2. Fabric bursting strength
3. Fabric tear strength
4. Fabric bending length, flexural rigidity and bending modulus
5. Drapability of fabrics
6. Fabric crease recovery
7. Fabric thickness
8. Fabric abrasion resistance
9. Fabric pilling resistance
10. Fabric air permeability
11. GSM of fabric

**TOTAL: 60 PERIODS**

**OUTCOMES:**
Upon completion the students will be able to
- Measure important characteristics of fabric and garment
- Interpret the results obtained during evaluation of fabrics

**LAB EQUIPMENTS**
**LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS**
1. Fabric tensile strength tester 1 No.
2. Fabric tearing strength tester 1 No.
3. Fabric Thickness Tester 1 No.
4. Fabric Stiffness Tester 1 No.
5. Fabric Crease Recovery Tester 1 No.
6. Fabric Bursting Strength Tester 1 No.
7. Fabric Abrasion Resistance Tester 1 No.
9. Wrinkle recovery tester 1 No.
10. Fabric Crock meter 1 No.
11. Fabric air permeability tester 1 No.
12. Weighing balance 1 No.
13. Fabric Drape meter 1 No.

HT8612 CHEMICAL PROCESSING LABORATORY II L T P C

OBJECTIVE:
- To enable the students, to gain knowledge of printing and other finishing processes of textile materials.

LIST OF EXPERIMENTS
1. Printing of cotton fabrics with Pigments by Direct style using Blocks / screens
2. Printing of silk fabrics with Acid Dyes by Direct style using Blocks / Screens
3. Printing of polyester fabrics with Disperse dyes by Direct style using Blocks / Screens
4. Discharge style printing of cotton fabrics dyed with Reactive dyes
5. Discharge style printing of silk fabrics dyed with Acid/Metal complex dyes
6. Printing of cotton fabric by resist style (Batik printing) using Reactive cold brand / cold dyeing Vat dyes
7. Tie and dye (Resist style) of cotton yarn and fabric using Reactive / Vat dyes
8. Printing of Polyester/Cotton blends with Disperse/Reactive dyes by Direct style using Block / Screen
9. Crease resistance finishing on cotton fabric
10. Water resistance finishing on cotton fabric
11. Determination of Dimensional Change of cotton fabrics

OUTCOME:
- Upon completing this practical course, the student will be able to print and finish different fabrics with different types of colourants

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
1. Stainless vats (500 ml each) - 30 Nos.
2. Thermometers - 5 Nos.
3. Stirrer - 1 No.
4. Steam ager - 1 No.
5. Pilot padding mangle - 1 No.
6. Pilot curing chamber - 1 No.
7. Hot air oven - 1 No.
8. Printing table - 1 No.
11. Crease recovery tester - 1 No.
13. Shrinkage template - 1 No.
14. Front loading washing machine - 1 No.
15. Tumble drier - 1 No.

HT8613 FABRIC STRUCTURE LABORATORY II

OBJECTIVES:
- To enable the student to analyse the given fabric sample (advanced structures) to extract the weave and construction details
- To enable the students to furnish the data required for reproduction of simple and compound figured fabrics.

LIST OF EXPERIMENTS
1. Design development on graph paper and card punching procedures for reproduction of figured single cloth
2. Design development on graph paper and card punching procedures for reproduction of damask fabrics
3. Design development on graph paper and card punching procedures for reproduction of figured double cloth with 2 colour and 4 colour effects
4. Design development on graph paper and card punching procedures for reproduction of figured warp/weft backed cloth
5. Design development on graph paper and card punching procedures for reproduction of figured extra warp and extra weft fabrics
6. Design development on graph paper and card and punching procedures for reproduction of figured terry structures.
7. Study of figured pique structures, graph design development and card cutting procedures for these structures
8. Study of patent satin structures, graph design development and card punching procedures for these structures
9. Study of figured terry structures, graph design development and card punching procedures for these structures
10. Study of tapestry structures, graph design development and card cutting procedures for these structures

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
1. Lab Desks - 15 Nos.
2. Card punching machines - 4 Nos.
4. Handloom with Jacquard - 5 Nos.

TOTAL: 60 PERIODS

OUT COMES:
Upon completion of the syllabus, the students will be able to draw designs for different varieties of figured and compound fabrics with colour combination and
- Analyse the weave, draft and peg plan of the fabric
- Extract the quality particular of fabric for its reproduction
- Calculate the quantity of yarn requirement for warp and weft
- Apply appropriate technique for the production of figured simple and compound structures

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OBJECTIVES:
- To enable the student to analyse the textile fabrics with respect to count, construction, weave and production techniques
- To enable the students to do the costing of fabrics
- To train the students in construction of garments

LIST OF EXPERIMENTS
1. Stitch classification and stitch properties.
2. Formation of Stitch classes
3. Study of seam classification and common uses
4. Formation of superimposed seam, lapped seam, bound seam and flat seam.
5. Button hole making and button stitching
6. Study of Feed-of-the-arm machine
7. Pattern making for Men’s wear
8. Cutting for Men’s wear
9. Sewing and finishing Men’s wear
10. Pattern making for Women’s wear
11. Cutting for Women’s wear
12. Sewing and finishing for Women’s wear

TOTAL: 60 PERIODS

OUTCOMES:
- Upon completion of this practical course, the students can analyse the woven fabrics and give the particulars for their reproduction along with the estimated cost of production
- They can carry out different types of stitching, button holing and button stitching and would have hands on experience on different machines used for garment manufacture.

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
- Single needle lock stitch machine - 15 Nos.
- Double needle lock stitch machine - 01 No.
- Over-lock machine - 01 No.
- Feed-of-the-arm machine - 01 No.
- Button stitch machine - 01 No.
- Button hole machine - 01 No.
- Flat lock machine - 01 No.
- Zigzag machine - 01 No.
- Straight knife cutting machine - 01 No.
  - Steam pressing table (Desirable) - 01 No.
  - Iron box (electric) - 04 Nos.
  - Folding clips ¼", ½", 3". - 2 each
  - Cylinder bed Sewing machines - 1(Preferable)
  - Collar & Cuff recessing machine - 1(Preferable)
- Basics of financial management that are required for the textile industry
- Determination of cost of yarn, fabric and garment

**UNIT I**

Costing - concepts; classification of costs; preparation of cost sheet; costing of yarn, fabric and garment; cost profit volume analysis, breakeven analysis

**UNIT II**

Depreciation – method of computing depreciation; techniques of investment analysis – payback period method, accounting rate of return, Discounted Cash Flow methods - IRR, NPV, PI

**UNIT III**

Capital structure; Sources and cost of capital; working capital management

**UNIT IV**

Tools for financial analysis and control- profit and loss account, balance sheet; ratio analysis - illustrations from textile unit

**TOTAL: 45 PERIODS**

**OUTCOMES:**

Upon completion of the course, the students will be able to

- Explain the basics of financial management applied to textile industry
- Understand the economical feasibility of capital investment, sources of capital and cost of capital applied

**TEXT BOOKS:**


**REFERENCES:**

1. Bhave P.V. and Srinivasan V., "Costing Accounting to Textile Mills", ATIRA, Ahmadabad, 1976

**HT8712**

**COMPUTER AIDED TEXTILE DESIGN LABORATORY**

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**OBJECTIVE:**
To Train the Students in different kinds of designing software and the CATD system.

LIST OF EXPERIMENTS:
1. Creation of design using paint shop pro.
2. Creation of design using Adobe Photoshop.
3. Creation of design using Corel draw.
4. Conversation of vector image into Raster image.
5. Creation of dobbi designs using CATD software.
6. Creation of Jacquard designs using CATD software.
7. Creation of printing designs using CATD software.
8. Extraction of design from the given cloth sample using CATD software.
9. Extraction of design from the given paper painted design sample using CATD software.
10. Enlargement of design in suitable form for electronic card punching machine using CATD software.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of this course, the student will be able to
- Know the application of computer in the field of textile designing.
- Creation of designs for various textile fabrics using CATD softwares.

LIST OF EQUIPMENTS FOR BATCH OF 30 STUDENTS
1. Textile designing software - 1 No.
2. Designing software - 1 No. with 30 user licence
4. Scanner - 1 No.
5. Digitizer - 2 Nos.
6. Colour printer - 1 No.

TT8491 KNITTING TECHNOLOGY

OBJECTIVES:
To make the students to understand
- Fundamentals of knitting
- Types of knitting processes in detail
- Functioning of components of knitting machine

UNIT I INTRODUCTION TO KNITTING

UNIT II FUNDAMENTALS OF KNITTING
General definitions and principles of knitting; Types of knitting needles – Bearded, Latch & Compound Needle. Elements of knitted loop structure.

UNIT III WEFT KNIT STRUCTURES
Basic weft knitted structures and their production - plain, rib, interlock and purl; Fundamentals of formation of knit, tuck and float stitches; factors affecting the formation of loop; effect of loop length and shape on fabric properties; Analysis of various types of weft knitted structure. Weft knitted fabric geometry.
UNIT IV  WEFT KNITTING MACHINES
Construction, Characteristics and working of circular knitting machines used for the production of basic structures; production of derivatives of weft knitted structures; needle control in circular knitting machines; quality control in knitted fabric production; production calculation. Basic principles and elements of flat knitting machines; different types of flat knitting machines - manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines.

UNIT V  WARP KNITTING
Basic principles; elements of warp knitted loop – open loop, closed loop; warp knitting elementschain link, chain links for simple patterns, guide bar movement mechanism, Tricot and Rachel warp knitting machines. Principles of double needle bar patterning, Terry pile fabric production. Let off system; run in value based on the lapping diagram; take up system; theoretical concepts of warp knitted loop configuration.; Uses of warp knitted fabrics in technical applications.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to understand the
• Principle of knitting by different types of knitting machines
• Structure and properties of fabric produced by different knitting machines

TEXT BOOKS:

REFERENCES:
OBJECTIVE:

- To objective of the project is to make use of the knowledge gained by the student at various stages of the degree programme.

The students are assigned project work related to product/process development, solution to the technical problems in industry and current research at national and international level. The student is required to submit a report at the end of semester based on the findings. The evaluation is made as per the Regulations of University.

OBJECTIVE:

- To enable the students to learn about the structure of ideal and real yarn, migration of fibres in the yarn, breakage mechanism of yarn, mechanics of blended yarns and relationship between structure and property of yarns produced by different spinning systems.

UNIT I  YARN GEOMETRY

Idealized helical yarn structure; yarn count and twist factors, twist contraction; packing of fibers in yarns; measurement of packing density and radial packing density of yarn; measurement of yarn diameter; ideal migration, tracer fiber technique, characterization of migration behavior, migration in blended yarns, mechanisms of migration, effect of various parameters on migration behavior.

UNIT II  MECHANICS OF CONTINUOUS FILAMENT YARNS

Analysis of tensile behavior; prediction of breakage; analysis of yarn mechanics by energy method; observed extension and breakage of continuous filament yarns; mechanics of torque in filament yarns

UNIT III  MECHANICS OF STAPLE FIBRE YARNS

Theoretical analysis; fiber obliquity and slippage; influence of fiber length, fineness and friction; strength of blended yarns - Hamburger's model

UNIT IV  WOVEN FABRIC GEOMETRY AND DEFORMATION

Elements of woven fabric geometry; Pierce and Olofsson models - form factor; jamming of threads, cover factor; crimp interchange, degree of set; modification to Pierce model - race track, saw tooth and bilinear models, extension behavior of woven fabric; prediction of modulus, tensile properties in bias direction; other fabric deformation - shear, buckling, bending and compression; fabric handle

UNIT V  NONWOVEN AND KNITTED STRUCTURES

Geometry of plain knitted structure, mechanics of non-woven fabrics
OUTCOMES:
Upon completion of the course the student will be able to understand the
- Models proposed for geometry of woven fabrics
- Characteristics of fabric on deformation
- Structural characteristics of knitted and nonwovens and the student can design the fabric to get the desired property

TEXT BOOKS:

REFERENCES:

TT8071 APPAREL PRODUCTION MACHINERY L T P C
3 0 0 3

OBJECTIVE:
- To acquaint students of the basic production machinery and equipments used in apparel construction

UNIT I FABRIC INSPECTION AND SPREADING MACHINES 9

UNIT II CUTTING MACHINES 9
Mechanism of straight knife cutting machines, rotary cutting machines, band knife cutting machines, die cutting, laser cutting, plasma cutting, water jet cutting and ultra sonic cutting; Notches, drills and thread markers; Computer interfaced cutting machines.

UNIT III SEWING MACHINES 9
Sewing machines – primary and secondary components; Working principle, stitch formation and timing diagram - lock stitch and chain stitch; single needle and double needle lock stitch mechanism: needle bar, hook – rotary and feed mechanism; Needles – geometry, types and selection

UNIT IV SPECIAL SEWING MACHINES 9
Over lock, Flatlock, Feed off arm, button fixing and button holing; Embroidery machines – mechanism and stitch formation; Sewing machines feed mechanisms; sewing machine attachments

UNIT V FINISHING MACHINES
Molding machineries; Shrinking machineries – London shrinking, hot-water shrinking, steam sharking and compaction shrinkage; Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers and advanced pressing machineries; Pleating – principles and mechanics machineries

OUTCOME:
• Upon completion of the course the student will be able to understand the fundamental principles and working of garment production machinery and the interrelationship of assembly methods

TEXT BOOKS:

REFERENCES:

HT8001 ADVANCED FABRIC MANUFACTURE L T P C
3 0 0 3

OBJECTIVE:
• To enable the students to learn advanced fabric structure, multi-layer fabrics, tapestry, etc.

UNIT I

UNIT II
Figured double cloth structure – use of similar colours in warp and weft – Use of different colours in warp and weft – Figured terry piles – Figured warp backed cloth – Figured weft backed cloth.

UNIT III
Figuring with extra threads – extra warp and extra weft – comparison – Extra warp figuring technique - Continuous, intermittent and spot styles – Anchoring of spot effects – Extra Weft figuring technique – Continuous, intermittent and spot styles – Anchoring of spot effects – Chintzing.

UNIT IV

UNIT V

OUTCOMES:
Upon completion of the course the student will be able to
• Understand about the figured fabrics, leno, tapestry and other advanced fabric structures
• Construct weave, draft, peg plan and other weaving techniques for the production of multi-layer and pile fabrics.

TEXT BOOKS:

REFERENCES:

GE8071 DISASTER MANAGEMENT L T P C
OBJECTIVES:
• To provide students an exposure to disasters, their significance and types.
• To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
• To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
• To enhance awareness of institutional processes in the country and
• To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don’ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9
Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9
Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:
The students will be able to
- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

TEXT BOOKS:
New Delhi, 2010.

REFERENCES:
1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005

TT8654 MECHANICS OF TEXTILE MACHINERY

OBJECTIVES:
To enable the students to learn about

- Basic elements used in the textile machinery
- Design of cams, cone drums and other important elements used in the textile machinery

UNIT I
Equations of forces, motion and energy; energy stored in rotating masses.

UNIT II
Clutches and brakes – types, application in textile machines; gears, gear trains; power transmission – different modes, advantages and limitations, applications

UNIT III
Differential and variable speed drives – principles, application in textile machines; design of cone drums – piano feed regulation, roving machine builder mechanism;

UNIT IV
Friction – calculations; bearings, design of drive transmitting shafts, balancing of rotating masses

UNIT V
Design of winder drums; kinematics of shedding; design of tappets; beat up force, sley eccentricity; power for picking

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course students will

- Have knowledge of types of gears, gear trains and their applications
- Be able to design cams, tappets and cone drums used in the spinning machinery
- Be able to understand the design aspects of machine elements for specific requirements

TEXT BOOKS:

REFERENCES:
2. https://nptel.ac.in/courses/116102012

TT8792 TECHNICAL TEXTILES

OBJECTIVE:
• To enable the students to learn about production, properties & application of various technical textile products viz., tyre cords, fabrics, belts, filter fabrics and medical textiles.

UNIT I  HIGH PERFORMANCE FIBRE  9

UNIT II  TYRE CORDS AND FABRICS  9
Requirements of tyre cord - suitability of various fibres-Polyester and Nylon tyre cords - manufacture of tyre cords - physical and mechanical property requirements of tyre cord fabrics- fabric design - Specifications - Rubberised textiles.

UNIT III  BELTS  9
Conveyor belts - physical and mechanical properties-construction, manufacture of conveyor belts & power transmission belts. HOSE: Construction, applications and properties (physical and mechanical).

UNIT IV  FILTER FABRICS  9
General consideration of filtration of solids from liquids, solid from gases, solids from solids, liquids from liquids, liquids from gases and gases from gases. PROTECTIVE CLOTHING: Fire protection-thermal protection - electro-magnetic protection - water proof fabrics - protection against microorganisms, chemicals and pesticides - protection against aerosols.

UNIT V  MEDICAL TEXTILES  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
• Understand different high performance fibres and their properties
• Explain various method of production of technical textiles, their properties and applications

TEXT BOOKS:

REFERENCES:
TT8081 TEXTILE EXIM MANAGEMENT

OBJECTIVE:

- To give the students an exposure on international market for textile products, regulations with respect to export and import of textiles

UNIT I

International markets for yarns, woven fabrics; international market for cotton, silk, jute, wool and other fibres; export and import of textiles by India – current status, promotional activities

UNIT II

International markets for carpets and home textiles – product types, market potential and statistics, India - current status and promotional activities, role of export promotional councils

UNIT III

International markets for woven piece goods, knitted garments, leather garments; statistics of international apparel market and trade; export incentives, role of AEPC, CII, FIEO, Textile Committee

UNIT IV

Marketing – strategies, global brand building; logistics & SCM; role of export finances & EXIM banking, ECGC, Indian council of arbitration, FERA; impact of foreign trade on Indian economy

UNIT V

Exim policy - customs act, acts relating to export/import of textile and apparel; Indian customs formalities - export documentation for excisable goods, import documentation, clearance of import goods; concepts - 100% export oriented units, export processing zones, special economic zones; duty drawback procedure; import/export incentives; licenses; case study

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall have the knowledge on

- International market for textile products
- Global marketing strategies and
- EXIM policy and procedures

TEXT BOOKS:


REFERENCES:

FT8652 INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY L T P C 3 0 0 3

OBJECTIVES:
To enable the students to learn about
- Basics of industrial engineering
- Different tools of industrial engineering and its application in apparel industry

UNIT I
Industrial Engineering - evolution, functions, role of industrial engineer

UNIT II
Methods study – introduction, techniques of recording; method analysis techniques; principles of motion economy; method study in garment manufacture; ergonomics- importance, workplace design, fatigue

UNIT III
Work measurement – introduction; time study – equipment and procedure; standard data; predetermined time standards; work sampling techniques; incentive wage system; work measurement applied to garment industry

UNIT IV
Site selection for textile industry; plant layout - types of layouts suitable for textile industry, methods to construct layout; line balancing

UNIT V
Statistical Process Control – data collection; concept of AQL, control charts in quality control; process capability

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course the student will be able to apply the following methodologies in apparel industry.
- Method study, work measurement
- Layout study and line balancing
- Statistical process control

TEXT BOOKS:

REFERENCES:

GE8075 INTELLECTUAL PROPERTY RIGHTS

OBJECTIVE:
- To give an idea about IPR, registration and its enforcement.

UNIT I INTRODUCTION
Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT II REGISTRATION OF IPRs
Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT III AGREEMENTS AND LEGISLATIONS

UNIT IV DIGITAL PRODUCTS AND LAW

UNIT V ENFORCEMENT OF IPRs
Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL: 45 PERIODS

OUTCOME:
- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXT BOOKS:

REFERENCES:

TT8791 OPERATIONS RESEARCH IN TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:
To enable the students to learn about
- Various operations research (OR) methods that can be applied in the textile industry
- Designing of OR problem related to textile industry
- Method of solving OR problems

UNIT I
Scope of operation research, applications, limitations; linear programming problems – construction, solutions by graphical method, simplex method, Big M method; sensitivity analysis; application of LP technique for mixing optimization in spinning mill

UNIT II
Transportation problem – construction, initial basic feasible solution – North West Corner rule, lowest cost entry method, Vogel’s Approximation Method; optimality test - … method, stepping stone method; replacement analysis

UNIT III
Assignment problem – construction, solution by Hungarian method, application in textile industry; sequencing problems; integer programming – construction, solving by cutting plane method

UNIT IV
Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry; inventory control - EOQ models-deterministic models –probabilistic models, simulation theory, models, queuing system.

UNIT V
Project planning and control models: CPM, PERT – network representation, determining critical path, project duration; crashing of project duration; resource leveling

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Design operations research problems that can be applied to textile industry.
- Solve the OR problems

TEXT BOOKS:

REFERENCES:
TT8075  HIGH PERFORMANCE FIBRES  L T P C  3 0 0 3

OBJECTIVES:
To enable the students to learn about
- Various high performance fibres which are used for application as technical textiles
- Production of high performance fibres

UNIT I  LINEAR POLYMER FIBRES  9
Introduction – linear polymer fibres; Aramid fibres - Polymer preparation, Spinning, Structure and properties and applications; Gel-spun high performance polyethylene fibres – Manufacture, Fibre characteristics, Properties, Yarn and fabric processing and applications; Other high modulus - high tenacity (HM-HT) fibres from linear polymers, melt-spun wholly aromatic polyester, PBO and related polymers, rigid-rod polymer, Russian aromatic fibres; Solid-state extrusion high-molecular weight polyethylene fibres

UNIT II  CARBON FIBRE  9
Introduction – carbon fibres; different types; PAN-based carbon fibres – manufacturing methods, properties and applications; Pitch-based carbon fibres - manufacturing methods, properties and applications; Rayon based carbon fibres - manufacturing methods, properties and applications; Vapour-grown carbon fibres; Carbon nanotubes - manufacturing methods, properties and applications.

UNIT III  GLASS AND CERAMIC FIBRES  9
Introduction, types of glasses, properties and applications; Glass fibre production – batch process, continuous process; Fibre finish, Glass fibre properties, applications; glass fibre composites – manufacturing methods and applications. Introduction to ceramic fibres – types, manufacturing methods; Silicon carbide-based fibres – manufacturing methods, properties and applications. Other non-oxide fibres - Alumina based fibres; other polycrystalline oxide fibres; Single-crystal oxide fibres – properties and applications

UNIT IV  CHEMICAL AND THERMAL RESISTANCE FIBRES  9
Chemical resistant fibres – Introduction; Chlorinated fibres – PVDC; Fluorinated fibres - PTFE, PVF, PVDF and FEP; Poly(etheretherketones): PEEK, Poly(phenylene sulphide), PPS, Poly(ether imide), PEI – manufacturing methods, properties and applications; Thermal resistant fibres – Introduction, Thermosets, Aromatic polyamides and polyarimids - manufacturing methods, properties and applications; Semi-carbon fibres - oxidised acrylics, Polybenzimidazole(PBI), Polybenzoxazoles (PBO) - manufacturing methods, properties and applications.

UNIT V  SPECIALITY FIBRES  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the students will have knowledge on
- Various high performance fibers and its polymers preparation
- Preparation and properties of carbon, glass, ceramic fibers and their application
- Hollow fibers and functional fibers

TEXT BOOKS:

REFERENCES:

TT8074

FUNCTIONAL FINISHES

OBJECTIVE:
- To enable the students to learn various finishes applied on the textile fabrics for different applications.

UNIT I REPELLENCY FINISH 9
Repellents applied to textile substrates; repellency tests; application of repellents by impregnation, coating and surface modification techniques.

UNIT II SOIL RELEASE AND ANTISTATIC FINISHING 9
Soil release agents; applications of soil-release finishes and testing; antistatic finishes-measurement, mechanism and antistatic agents applied on substrates.

UNIT III FLAME PROOFING 9
Flame retardant mechanisms; flame retarding chemicals for textile materials and testing of flame retardant finishes.

UNIT IV UV PROTECTION 9
UV radiation; factors affecting UV protection; UV protection finishes; measurement of UV protection.

UNIT V ANTIMICROBIAL FINISH 9
Basic of microbiology; classification; application of antimicrobial finishes; evaluation of antimicrobial finishes.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to state the
• Need for functional finishes and
• Methods of application of finishes and its evaluation.

TEXT BOOKS:

REFERENCES:

TT8080 TEXTILE COSTING

OBJECTIVE:
• To impart the knowledge of costing techniques used in manufacturing of apparel products.

UNIT I
Cost accounting, elements of cost, classification of cost elements – examples from spinning and weaving mill; standard costing, analysis of variance; breakeven analysis, cost volume profit analysis

UNIT II
Costing of yarn – material, labour, power and overhead expenses; allocation of costs to yarns in spinning mill running with different counts; costing of fabrics

UNIT III
Working capital management in spinning, weaving and chemical processing unit – determination, sources, cost; Budget, types of budgets, budgeting and control in textile unit

UNIT IV
Detailed project report – elements, preparation for textile unit

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
• Calculate the cost garment
• Understand the concept of preparation of cost sheet, budget and breakeven analysis

TEXT BOOKS:

REFERENCES:

FT8651 APPAREL MARKETING AND MERCHANDISING L T P C
3 0 0 3

OBJECTIVE:
- To acquaint the students of the concepts of business, merchandising, sourcing and export documentation

UNIT I INTRODUCTION TO APPAREL BUSINESS
International apparel business pattern, basic business concepts in Indian apparel export house, business operations in China and other south Asian countries. Business patterns for Indian apparel retail and home textiles. Understanding from concept board to finished product and its sequence.

UNIT II MARKETING FOR APPAREL AND TEXTILE PRODUCTS
Defining marketing, marketing mix the objectives of marketing department, market research, different types of markets, marketing strategies with respect to a product/brand, Indian apparel houses international marketing strategies and domestic marketing strategies, marketing models, B to B marketing, B to C marketing, direct marketing, digital marketing.

UNIT III MERCHANDISING
Concepts of merchandising, concepts and apparel product lines, dimensions of product change, determination and development of product line and product range. Creative and technical design in garments and accessories, new product development and seasons of sale, costing, coordination and communication with the production house and export house

UNIT IV SOURCING
Understanding the basics of sourcing, sourcing strategy and best sourcing practice in apparel and textile businesses, supply chain and demand chain understanding, sourcing negotiations, global co-ordination in sourcing, materials management and quality in sourcing, quick response and supplier partnership in sourcing, JIT technology.
UNIT V  EXPORT DOCUMENTATION AND POLICIES  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to apply
• Concept of marketing and merchandizing in the apparel industry in India
• Procedure involved in the export of apparel

TEXT BOOKS:

REFERENCES:

GE8076  PROFESSIONAL ETHICS IN ENGINEERING  L T P C
3 0 0 3

OBJECTIVE:
• To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I  HUMAN VALUES  10

UNIT II  ENGINEERING ETHICS  9

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.
UNIT IV       SAFETY, RESPONSIBILITIES AND RIGHTS


UNIT V       GLOBAL ISSUES


OUTCOMES:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:


REFERENCES:


Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

TT8073       ECO - FRIENDLY DYES, CHEMICALS AND PROCESSING       L T P C

OBJECTIVES:

- To impart knowledge about the environmental and ecological aspects of various chemicals, dyes and auxiliaries used in processing.
- To make the students aware of the alternative chemicals and dyes that can replace the harmful chemicals.
- To update the students on the various rules, regulation that governs the textile processing industry.
UNIT I INTRODUCTION


UNIT II ECO-FRIENDLY PREPARATION, DYEING, PRINTING AND FINISHING


UNIT III ECO-AUDIT


UNIT IV ECO-NORMS AND ECO-LABELING


UNIT V TESTING OF ECO-PARAMETERS


OUTCOME:

- The study of this course would help the students to understand and comprehend the human and environmental hazards involved in day to day production activities in a textile wet processing mill. This also helps and supports the students in making socially responsible and economically viable solutions.

TEXT BOOKS:


REFERENCES:


TT8078 PRODUCTION AND APPLICATION OF SEWING THREADS L T P C

3 0 0 3

90
OBJECTIVE:

- To enable the students to understand the requirements and production of sewing threads for different applications

UNIT I 13

Sewing threads – property requirements for different applications; ticket numbering; characterization of sewing threads; sewability of the thread, seam efficiency index

UNIT II 14

Types of sewing thread – spun threads, core spun threads, filament threads; production, properties and applications; fancy yarns – types and production; metallic yarns

UNIT III 13

Characteristics and application of high performance sewing threads - aramid threads, ceramic threads, polypropylene threads, polyethylene threads, polytetrafluoroethylene threads, fibreglass threads, other sewing threads – tencel, acrylic, linen, elastic, soluble; embroidery threads

UNIT IV 5

Sewing defects related to sewing threads – Assessment and control

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to understand the

- Production of sewing thread
- Characterization of sewing thread and
- Selection of sewing thread for different end uses.

TEXT BOOKS:


REFERENCES:


UNIT II
Rheological Behavior of Fluids—Rheology of Plastisols—Hydrodynamic Analysis of Coating, Clothing Comfort—Impermeable Coating—Breathable Fabrics

UNIT III

UNIT IV

UNIT V
Test methods for coated fabric evaluation; environmental norms for the chemicals used in coating industry.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students would be able to understand

- Need of coating of textiles for different applications
- Methods of coating of textiles
- Testing of coated fabrics

TEXT BOOKS:

REFERENCES:

GE8074 HUMAN RIGHTS L T P C
                                         3 0 0 3

OBJECTIVE:
• To sensitize the Engineering students to various aspects of Human Rights.

UNIT I

UNIT II

UNIT III
Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV
Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

TOTAL: 45 PERIODS

OUTCOME:
• Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

GE8072 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

OBJECTIVES:
• To understand the global trends and development methodologies of various types of products and services
• To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
• To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
• To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
• To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

UNIT III DESIGN AND TESTING 9

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

UNIT V BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Gain knowledge of the Innovation & Product Development process in the Business Context
- Work independently as well as in teams
- Manage a project from start to finish

TEXTBOOKS:
1. Book specially prepared by NASSCOM as per the MoU.

REFERENCES:
OBJECTIVES:
To enable the students to learn about the
- Important characteristics of the fabric responsible for its comfort properties and
- Different phenomena which take place in the fabric related to the comfort properties of the fabric

UNIT I
Comfort – types and definition; human clothing system, comfort perception and preferences

UNIT II
Psychological comfort; neuro-physiological comfort-basis of sensory perceptions; measurement techniques - mechanical stimuli and thermal stimuli

UNIT III
Thermo physiological comfort – thermoregulatory mechanisms of the human body, role of clothing on thermal regulations

UNIT IV
Heat and moisture transfer – moisture exchange, wearer’s temperature regulations, effect of physical properties of fibres, behaviour of different types of fabrics

UNIT V
Fabric tactile and mechanical properties - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness; predictability of clothing comfort performance

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand different phenomena such as perception of comfort, fabric mechanical properties and, heat and moisture interaction and
- Correlate the property of the fabric with comfort to the wearer

TEXT BOOKS:

REFERENCES:

TT8077 MEDICAL TEXTILES L T P C 3 0 0 3

OBJECTIVES:
After successful completion of this course, the students should be able to
- Outline on medical textile industry
- Explain properties, types, applications of implantable, non-implantable and drug delivery textiles
- Discuss on property requirements, applications and testing of biopolymers and Tissue engineering
- Summarize different types and its properties of wound care and reusable medical textiles
- Compare the characteristics of different smart medical textiles and its applications.

UNIT I INTRODUCTION 9
Medical textiles – classification, current market scenario in international and national level – government initiatives; antimicrobial fibres and finishes; nano fibrous materials and films; super absorbent polymers; operating room garments; personal health care and hygiene products and their testing methods; applications of non-wovens in medicine; textiles in infection prevention control.

UNIT II BIOPOLYMERS, TESTING AND TISSUE ENGINEERING 9
Biopolymers: classification and their properties, requirements, and applications, testing methods; In vitro tests – direct contact, agar diffusion & elution methods – in vivo assessment of tissue compatibility. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

UNIT III IMPLANTABLES, NON-IMPLANTABLES AND DRUG DELIVERY 9
Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties; implantable textiles: hernia mesh – vascular prostheses – stents; Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.

UNIT IV WOUND CARE AND REUSABLE MEDICAL TEXTILES 9
Wound: types and healing mechanism- textile materials for wound dressing – bio active dressing – anti microbial textiles dressing – composite dressing — testing of wound care materials; Wound compression textiles; Reusable medical textiles: types, advantages, physical properties and performance — reusable processing methods.

UNIT V SMART MEDICAL TEXTILES AND LEGAL ISSUES 9
Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials – monitoring pregnancy, children and cardio patients – mobile health
monitoring; electronics in medical textiles; Smart textiles in rehabilitation and applications; textile sensors for healthcare; legal and ethical values involved in the medical textile materials.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall know the
- Types of materials available for biomedical applications
- Functional requirements of textile structures for specific end use and
- Selection and characterization of textile materials used for biomedical applications

TEXT BOOKS:

REFERENCES:

HT8003 HUMAN RESOURCE MANAGEMENT

OBJECTIVES:
- To enable the students to gain knowledge on the human resource management
- To enable the students to effectively plan and manage the human resource in the handloom and textile industry

UNIT I

UNIT II

UNIT III
Recruitment: Definition, Importance and Process of Recruitment-Current Trends in Recruitment-Recruitment Source-Internal and External Sources of Selection-Selection Process Methods of Selection-Types of Tests-Types of Interview-Induction Types of Induction and Importance of
Induction- Training and Development-Needs of Training- Type of Training and Types of Training Methods-Process of Training- TNA (Training Need analysis) Need & Benefits

UNIT IV
Wages: Meaning and Definition- Wages vs Salary- Classification of Wages-Methods of Wage Payment -Incentive Schemes- Importance of Incentives Schemes-Employee Benefits Purpose-Categories of Employee Benefit- Health and Safety Need- Accident Prevention-Compensation Policy -Types of Compensation Policy

UNIT V

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of this course, the students will be able to effectively plan and manage the Human resource in the handloom and textile industry

TEXT BOOKS:

REFERENCES:
2) Max Muller -The Manager’s Guide to HR- 2nd Edition
3) Editors -Sanjeev Bansal, Jaya Yadav &Hara Govind Kakaa-Case Studies in Human Resource

TT8076 HOME TEXTILES L T P C
3 0 0 3

OBJECTIVES:
- To enable the students to learn about the
- Recent developments in furnishing, floor covering and other home textile products Various kinds of materials used in home textile.

UNIT I FURNISHINGS
Developments in Textile Furnishing; Type of Furnishings Materials – Woven and non-woven; Factors affecting selection of Home Furnishings.

UNIT II FLOOR COVERINGS
Recent Developments in manufacturing of floor coverings -Hard Floor Coverings, Resilient Floor Coverings, Soft Floor Coverings, Rugs, Cushion and Pads; Care of floor coverings.
UNIT III  CURTAINS AND DRAPERIES

UNIT IV  HOME FURNISHING
Advances in period style in, Different styles, and use of Colours, design & texture in home furnishing. Developments in living room furnishing including upholstery, Wall Hangings, Cushion, Cushion Covers, Bolster and Bolster Cover.

UNIT V  BED LINENS
Advances in the production of - Different Types of Bed Linen, Sheets, Blankets, Blanket Covers, Comforts, Comfort Covers, Bed Spreads, Mattress and Mattress Covers, Pads, Pillows.

OUTCOMES:
Upon completion of this course, the student shall be able to
- Know about different types of home textiles
- Understand the production method of different types of home textile products

TEXT BOOKS:

REFERENCES:

GE8077  TOTAL QUALITY MANAGEMENT
L T P C
3 0 0 3

OBJECTIVE:
- To facilitate the understanding of Quality Management principles and process.
The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV  **TQM TOOLS AND TECHNIQUES II**  9
Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V  **QUALITY MANAGEMENT SYSTEM**  9

TOTAL: 45 PERIODS

OUTCOME:
- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

REFERENCES:
4. ISO9001-2015 standards

**HT8002  ETHNIC HANDLOOM FABRICS**  L T P C  3 0 0 3

OBJECTIVES:
- To enable the students to know the importance of textures and special features of ethnic handloom fabrics
- To enable the students to know the richness and importance of traditional handloom fabrics

**UNIT I**  9
Study of construction details, loom particulars, production techniques (raw material to end product), and specialty of Kanchipuram Saree, Chanderi Saree, Balaramapuram Saree, Venkatagiri Saree, Banaras Brocade and Saree, Paithani Saree, Baluchari Saree, megheswari saree, Jamdani, Awadh Jamdani, Muga silk saree of Assam

**UNIT II**  9
Study of construction details, loom particulars, production techniques (raw materials to end product) and Specialty of Patola Saree of Gujarat, Ikats of Andhra Pradesh and Orissa, Kalam Kari, Tie and Dye fabrics of Rajasthan-Bhandhej, Mothda & Laheriya

**UNIT III**  9
Construction details, loom particulars, production techniques (Raw Material to end products) and specialty of Salem silk and cotton Dhotis, silk and Cotton Angavastram, Handloom Lungies. Study of stoles - Kinnori stole, Pashmina stole, Tangalia stole, Bagru block print stoles.

UNIT IV
9
Study of shawl - Himroo Shawl, Kullu Shawl, Naga Shawl, Wool Jamawar Shawls, Cashmere Check Shawl, Pashmina Shawls
Carpets – Hand Woven Pile Carpets, Plain & Figured Durries, Panipet Khes and Tapestry – Furnishing & made – ups of Kannur.

UNIT V
9
Study of handloom articles reserved for exclusive production on handlooms Saree, Dhoti, Towel and Gamcha, Angavastarm, Lungi, Khes, Bed sheets, Bedcover, Counterpane Furnishing (including Tapestry, Upholstery) Jamakkalam, Durry or Durret, Dress material, Barrack Blankets and Kambal or Kambles, Shawl, Loi, Muffler, Pankhi, Woollen Tweet, Chaddar, Mekhala or Phanek.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student will be able to
- Identify the ethnic handloom fabrics
- To give technical input for production ethnic handloom fabrics

TEXT BOOKS:
3. Dr. Moti Chandra, “Ikat sarees of Orissa and Andhrapradesh”, Calico museum of Textiles, Ahmedabad, 1974

REFERENCES:
2. “Indian Handlooms – Tantavi heritage catalogue” NCTD, O/o. Development Commissioner for Handlooms, New Delhi, 2012-13

FT8071 BRAND MANAGEMENT L T P C 3 0 0 3

OBJECTIVE:
- To introduce students to the concept of brand, brand building, branding strategies and legal issues in brand management

UNIT I
9
Product – definition, types; product line, product mix; new product development; estimating market and sales potential, sales forecasting

UNIT II
13
Brand – definition, evolution, importance; product vs brand; terminologies used in branding; branding – meaning, creation, challenges; brand design – understanding consumer, competition, components, brand identity - brand naming, logos, characters, slogans, tools to maintain identity, illustrations from apparel industry

101
UNIT III  
Brand Building: brand insistence model; advertising – definition, objectives, modes, economic and ethics; non traditional marketing approach  

UNIT IV  
Branding strategies; brand extension, brand revitalization, brand repositioning, brand recall, brand elimination, brand imitation  

UNIT V  
Brand equity measurement systems; legal issues in brand management; global branding  

OUTCOME:  
- The students would have knowledge on consumer behaviour, brand identity and brand equity management  

TEXT BOOKS:  

REFERENCES:  

TT8079  
PROTECTIVE TEXTILES  
L T P C  
3 0 0 3  

OBJECTIVES:  
- To gain knowledge about fibre structure and its geometry  
- To study the influence of comfort properties of protective clothing  

UNIT I  
FIBRES, YARNS AND FABRICS FOR PROTECTIVE GARMENTS  
Selection of fibres-suitability and properties of high performance fibres for various protective clothing, chemical composition and physical structure, characteristics and working of various fibres according to different end uses like thermal protection, ballistic protection, anti-microbial protection, Protection against cold etc. Yarn and fabric (knitted, woven and Non-woven) parameters, their methods of production, effect of structure on their performance; use of composite materials in yarn and fabric formation used for protective end uses.  

UNIT II  
CHEMICAL FINISHES FOR PROTECTIVE GARMENTS  
Use of coated fabrics – different types of finishes like fire retardant finishes, for different textile materials, water repellent finishes, anti-microbial finishes; chemical finishes against radiation and chemicals – method of application of those finishes; machines and techniques used for such applications; protective finishes for health care garments.  

UNIT III  
PROTECTIVE GARMENTS IN OTHER APPLICATIONS  
Protective fabrics used in the medical field and in hygiene; military combat clothing; protective fabrics against biological and chemical warfare; textiles for high visibility.  

UNIT IV  
GARMENT CONSTRUCTION  
Garment construction – method of construction of garments according to various protective end
uses like protection against cold, heat, chemical, ballistic protection etc.; use of different fabric type – knitted, woven, and Non-woven; coated / laminated in protective applications different places; use of inter lining and composites.

UNIT V EVALUATION OF PROTECTIVE GARMENTS

Evaluation of protective fabrics – desirable properties of protective textiles, method of testing for thermal protective performance, water, cold, abrasion and wear resistance; evaluation of resistance in to mildew, ageing, sunlight, chemical, electrostatic and electrical resistivity, impact properties; ASTM standards for protective garments.

OUTCOME:
- The students would develop an understanding of the materials, chemical finishes, garment construction and evaluation methods of protective garments

TEXT BOOKS:

REFERENCES:

TT8093 TEXTILE REINFORCED COMPOSITES L T P C

OBJECTIVES:
- To acquire knowledge on constituents of composite materials
- To get exposure to various composite manufacturing technologies and testing of composites

UNIT I COMPOSITES REINFORCEMENT AND MATRICES


UNIT II COMPOSITES MANUFACTURING TECHNOLOGIES


UNIT III  DESIGN OF STRUCTURE WITH COMPOSITES


UNIT IV  MECHANICS AND TESTING OF COMPOSITES


UNIT V  APPLICATIONS OF COMPOSITES


TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Select different types of textile reinforcements and matrices for the manufacture of composites for getting different characteristics and
- Evaluate the characteristics of composites

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
- To provide an insight on the fundamentals of supply chain networks, tools and techniques.

UNIT I  INTRODUCTION
Role of Logistics and Supply chain Management: Scope and Importance- Evolution of Supply Chain - Decision Phases in Supply Chain - Competitive and Supply chain Strategies – Drivers of Supply Chain Performance and Obstacles.

UNIT II  SUPPLY CHAIN NETWORK DESIGN

UNIT III  LOGISTICS IN SUPPLY CHAIN
Role of transportation in supply chain – factors affecting transportation decision – Design option for transportation network – Tailored transportation – Routing and scheduling in transportation.

UNIT IV  SOURCING AND COORDINATION IN SUPPLY CHAIN
Role of sourcing supply chain supplier selection assessment and contracts- Design collaboration - sourcing planning and analysis - supply chain co-ordination - Bull whip effect – Effect of lack of co-ordination in supply chain and obstacles – Building strategic partnerships and trust within a supply chain.

UNIT V  SUPPLY CHAIN AND INFORMATION TECHNOLOGY
The role IT in supply chain- The supply chain IT frame work Customer Relationship Management – Internal supply chain management – supplier relationship management – future of IT in supply chain – E-Business in supply chain.

TOTAL: 45 PERIODS

OUTCOME:
- The student would understand the framework and scope of supply chain networks and functions.

TEXT BOOK:

REFERENCES:

TT8851  BONDED FABRICS  L T P C 3 0 0 3

OBJECTIVES:
To enable the students to learn about the
• Fundamentals of bonded fabrics
• Different method of web formation and bonding

UNIT I  FUNDAMENTALS OF BONDED FABRICS  5
Definitions and classification of bonded fabrics; fibres, fibre preparations and their characteristics for the production of bonded fabrics, uses; methods of bonded fabric production

UNIT II  WEB FORMATION WITH STAPLE FIBRES  9
Production of staple-fibre web by dry and wet methods; influence of web laying methods on fabric properties; quality control of web

UNIT III  MECHANICAL, CHEMICAL AND THERMAL BONDING  13
Bonded fabric production by mechanical bonding - needling, stitching, water jet consolidation; Thermal Bonding technologies; Chemical bonding – Binder polymers and bonding technologies

UNIT IV  POLYMER – LAID WEB AND FABRIC FORMATION  9
Manufacture of Spun bonded fabrics, fibre orientation in spun bonded fabrics and characterization of filament arrangement; Manufacture of Melt blown fabrics – fibre formation and its attenuation; Effect of processing parameters on fabric characteristics

UNIT V  FINISHING AND APPLICATION OF BONDED FABRICS  9
Dry and Wet finishing; Characterization, structure - property relationship in bonded fabrics; End uses of bonded fabrics

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to
• Explain different types of nonwovens and their method of production
• Explain different type of finishes applied on the fabric and their end uses
• Choose appropriate bonded technique for getting desired properties in fabric.

TEXT BOOKS:

REFERENCES:

GE8073  FUNDAMENTALS OF NANOSCIENCE  3 0 0 3

OBJECTIVE:
• To learn about basis of nanomaterial science, preparation method, types and application

UNIT I  INTRODUCTION  8
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II GENERAL METHODS OF PREPARATION 9
Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III NANOMATERIALS 12

UNIT IV CHARACTERIZATION TECHNIQUES 9

UNIT V APPLICATIONS 7

TOTAL: 45 PERIODS

OUTCOMES:
- Will familiarize about the science of nanomaterials
- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial

TEXT BOOKS:

REFERENCES: