

COURSE STRUCTURE

&

SYLLABUS (3rd – 8th SEMESTER)

FOR B.TECH PROGRAMME IN TEXTILE ENGINEERING

**BIJU PATNAIK UNIVERSITY OF TECHNOLOGY ORISSA,
ROURKELA**

2007 - 2008

**COURSE STRUCTURE
SECOND YEAR B.TECH PROGRAMME
TEXTILE ENGINEERING**

3rd Semester			4th Semester		
<i>Theory</i>	<i>Contact Hrs. Credit</i>		<i>Theory</i>	<i>Contact Hrs. Credit</i>	
	L-T-P			L-T-P	
CPTX 8201 Textile Fibre - I	3-0-0	3	CPTX 8202 Textile Fibre - II	3-0-0	3
BENG 1201 Electrical Machine	3-1-0	4	BENG 1208 Fluid Mechanics & Hydraulic Machines	3-1-0	4
or			or		
BENG 1208 Fluid Mechanics & Hydraulic Machines			BENG 1201 Electrical Machine		
CPTX 8203 Yarn Manufacture - I	3-1-0	4	CPTX 8204 Yarn Manufacture - II	3-1-0	4
BCSE 3201 Object Oriented Programming Using C++	3-0-0	3	BCSE 3202 Relational Database Management System	3-0-0	3
HSSM 4201 Engineering Economics & Costing	3-0-0	3	HSSM 4202 Organisation Behaviour	3-0-0	3
or			or		
HSSM 4202 Organisation Behaviour			HSSM 4201 Engineering Economics & Costing		
CPTX 8205 Fabric Manufacture - I	3-1-0	4	CPTX 8206 Fabric Manufacture - II	3-1-0	4
Total		20	Total		20
<i>Practicals/Sessionals</i>	<i>Contact Hrs. Credit</i>		<i>Practicals/Sessionals</i>	<i>Contact Hrs. Credit</i>	
BENG 9202 Basic Electronics Laboratory	0-0-3	2	BENG 9201 Basic Electrical Engineering Laboratory	0-0-3	2
or			or		
BENG 9201 Basic Electrical Engineering Laboratory			BENG 9202 Basic Electronics Laboratory		
BCSE 9201 OOPs Computer Lab	0-0-3	2	BCSE 9202 RDBMS Laboratory	0-0-3	2
CPTX 9201 Yarn Manufacture Laboratory - I	0-0-3	2	CPTX 9203 Yarn Manufacture Laboratory - II	0-0-3	2
CPTX 9202 Fabric Manufacture Laboratory - I	0-0-3	2	CPTX 9204 Fabric Manufacture Laboratory - II	0-0-3	2
		8			8
Total		28	Total		28

L-Lecture

T-Tutorial

P-Practical

3rd Semester
CPTX 8201 TEXTILE FIBRE - I (3-0-0)

Module-I (8 hours)

1. Requirements of fibre formation, molecular weight, degree of polymerisation, orientation and crystallinity. Classifications of Textile Fibres according to their nature and origin. Characteristics of good textile fibre, essential and desirable properties of apparel grade textile fibres & technical grade textile fibres

Module – II (12 Hrs)

2. **Natural Fibres :- Vegetable Fibres :-**
Seed Fibres : Cotton - Cultivation and harvesting practices, Ginning, Grading, Baling , morphological structure, physical and chemical properties and its applications.
Bast Fibres : Jute - Cultivation and Harvesting, Retting, Scuthing, bailing, woollenisation of jute, structure of jute fibre, effects of various treatments on jute fibre. Physical & Chemical properties of jute fibre, applications of jute fibre.
Other bast fibres - Hemp, flax, ramie, linen fibre , their Physical & Chemical properties and applications.
Leaf fibres - pineapple fibres, their properties & applications.

Module – III (10 hours)

3. **Natural Fibres :- Protein Fibres**
Silk : Sericulture, Type of Silk fibres, Pre and post cocoon operation Degumming, Reeling, morphological structure of silk fibre etc. Physical and chemical properties of the silk fibre.
Wool : **Wool** - types of wool, grading of wool, morphological structure of wool fibre, physical & chemical properties of wool fibre and its application.

Module – IV (6 hours)

Identification of Cotton, Jute, Silk and Wool fibres

REFERENCE BOOKS:

1. Textile Fibre, V. A. Shenai
2. Introduction to Textile Fibres, H. V. Sreenivas Moorthy
3. Dyeing & Chemical Technology of Textile Fibres, E. R. Trotman
4. Introduction to textiles, M. Joseph
5. Fibre Science and Tecnology, S.P.Mishra

BENG 1201 ELECTRICAL MACHINES (3-1-0)

Module I (10 Lectures)

D.C Mechanics :

D.C Generator – construction and principle of operation, E.M.F. equation ; types of generator; no load and load characteristics; Voltage build-up of shunt

Generator; voltage regulation, Application.

D.C Motor –construction and principle of operation ; back E.M.F; torque and speed equations; characteristics and performance curves; speed control of series and shunt motors; motor starters; industrial application.

Losses and Efficiency of D.C machines.

Module II (10 Lectures)

Transformer :

Single phase – construction and principle of operation; E.M.F. equation; Phasor diagram; actual and approximate equivalent circuits; open and short circuit tests, voltage regulation; losses and efficiency.

Three Phase – Construction and principle of operation; connection of three single –phase units in wye, delta, open delta configurations; Autotransformer; conventional transformer connected as Autotransformer. Special Transformers – induction heating and high impedance and high frequency transformer.

Module III (10 Lectures)

Synchronous Machines :

Three- phase alternators – construction and principle of operation; E.M.F. equation; distribution and pitch factors; Synchronous reactance; performance of alternators on no-load and load; Phasor diagram; voltage regulation, power calculations of turbine and hydro-generators,; synchronization of a generator.

Three-Phase Synchronous Motor- construction and principle operation; V- curves; Phasor diagram; methods of starting; applications.

Module IV (10 Lectures)

Three-Phase induction Motor- construction of slip ring and squirrel cage type induction motors; Phasor diagram and equivalent circuit; torque-slip characteristics; maximum torque calculations; open and short-circuit tests; losses and efficiency; starting of induction motors; speed control; Induction generator.

Single- Phase Induction Motor- construction and principle of operation; capacitor- start and capacitor-run motors; Universal motor; Stepper motors.

Books :

1. Electrical Machines, Drives and Power Systems, 5th edition by Theodore Wildi (Pearson) : Text.
2. Electrical Machinery by A.E. Fitzgerald and Charles Kingsley, Jr., and S.D. Umans, Tata McGraw Hill Publication.
3. Principles of Electric Machines by V.K Meheta and R. Meheta , S. Chand Publication.

BENG 1208 - FLUID MECHANICS AND HYDRAULIC MACHINE (3-1-0)

Module – I

(12 hours)

Introduction : Scope of fluid mechanics and its development as a science

Physical property of Fluid

Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.

Fluid static

Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, manometer.

Hydrostatic process on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface.

Module – II (12 hours)

Buoyancy and flotation, Archimedes' principle, stability of immersed and floating bodies, determination of metacentric height.

Fluid kinematics : Introduction, description of fluid flow, classification of fluid flow. Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity.

Fluid dynamics : Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation, Analysis of finite control volumes and its application to siphon, venturimeter, orifice meter

Module – III (6 hours)

Turbine : Classification, reaction, Impulse, outward flow, inward flow and mixed flow turbines, Francis & Kaplan turbines, Pelton wheel, Physical description and principle of operation, Governing of Turbine.

Module – IV (8 hours)

Centrifugal Pump : Principles of classification, Blade angles, Velocity triangle, efficiency, specific speed, characteristics curve.

Reciprocating Pump : Principles of working, slip, work done, effect of acceleration and frictional resistance, separation

Text Books

1. Fluid Mechanics, A.K. Mohanty, PHI
2. Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, TMH
3. Fluid Mechanics, Modi & Seth

CPTX 8203 YARN MANUFACTURE - I (3-1-0)

Module I (14 hours)

1. Formulation of cotton mixing:

Objects of Mixing , general consideration for preparation of cotton mixing ,scientific bale management, Methods of mixing and blending.

2. Blow Room:

Principal action in opening and cleaning. Study of various types of machinery arranged in the sequence of a single process Blowroom Line for the various type of mixing. Study of various openers & cleaners like Mixing bale opener, unifloc, blendomat, monocylinder, axiflow cleaner, uniclean, CVT, etc. Concept of measuring of opening and cleaning efficiency of different opener and cleaner. Method of dust extraction in Blow Room . Study of lap forming unit and chute feed mechanism and their comparison . Process parameters of Blow Room ,.Waste control in Blow Room. Calculation relating to production and efficiency of machines. Maintenance schedules.

Module II (14 hours)

3. Carding:

Objects of Carding. Constructional Features of Carding Machine. Principles of carding & stripping actions , Study of different parts and function of a Carding Machine. Settings and gauging of different parts of Carding Machine. Mechanical and Actual draft. . Study of card clothing :- metallic wire geometry of licker-in, cylinder, flat and doffer wire. Mechanics of fibre entanglement and fibre transfer during carding, Mechanics of neps and hook formation and its effect on yarn quality. Card waste – types and control. Calculation of production, speed, draft etc related to carding machine. calculation in

card . Defects in card Sliver and their causes and remedies. Maintenance schedules. Study of the function of Auto leveler in Card.

Module III

(9 hours)

4. Draw Frame:

Objects of Drawing. Principles of doubling and drafting. Study of different parts and function of a Draw Frame Machine. Study of commonly used drafting systems in draw frame. Drafting irregularities and its remedies. Design and principle of Auto leveler. Quality and Process parameters of Draw Frame department and its evaluation. Study of High Speed DrawFrame. Production calculations. Maintenance schedules.

Module IV

(09 hours)

5. Combing:

Objects of Comber. Methods of lap preparation for comber Machine . Mechanism of combing operation (Combing Cycle). Noil Theory. Types of feed and its effect on noil extraction. Process parameters & evaluation. Production calculations .Maintenance schedules.

REFERENCE BOOKS:

1. Manual Cotton Spinning-Vol.to 5, Textile Institute
2. A practical Guide to Opening & cleaning, W. Klien
Draw frame, Speed frame & Comber, Ring Spinning (All parts)
3. The Institute of Technology , Szalowski USE series on Textile Processing
4. Recent Advances in Spinning Technology, Salhotra
5. Spun Yarn Technology, Oxtoby

BCSE 3201 OBJECT ORIENTED PROGRAMMING USING C++ (3-0-0)

Module I

(10 hours)

Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ -syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions, operators. Flow control, functions, recursion. Arrays and pointers, structures.

Module II

(10 hours)

Abstraction mechanisms: Classes, private, public, constructors, member functions, static members, references etc. Class hierarchy, derived classes.

Inheritance: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Module III

(12 hours)

Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O operators etc.

Memory management: new, delete, object copying, copy constructors, assignment operator, this input/output.

Exception handing: Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Module IV

(8 hours)

Templates and Standard Template library: template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type.

Design using C++ design and development, design and programming, role of classes.

Text Books:

1. Bhav & Patekar- Object oriented Programming with C++, Pearson Education
2. Ashok N. Kamthane- Object oriented Programming with ANSI & Turbo C++, Pearson Education.
3. Robert Lafore- Object oriented programming in Microsoft C++.
4. Balguru Swamy-C++, TMH publication

HSSM 4201 ENGINEERING ECONOMICS AND COSTING(3-0-0)

Module I (10 hours)

Present worth comparisons, Comparisons of assets with equal, unequal and infinite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 hours)

Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost – effectiveness analysis.

Module III (10 hours)

1. Horn green, C.T., Cost Accounting, Prentice Hall of India
2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition,

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I (8 hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II (10 hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Hertzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III (12 hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. **Leadership** – Leadership & Management,

Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Followership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV

(10 hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Case Analysis

TEXTBOOKS:

Keith Davis, Organizational Behaviour, McGraw – Hill.

K.Aswathappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS:

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.

Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

CPTX 8205 FABRIC MANUFACTURE - I (3-1-0)

Module I

(12 hours)

1. WINDING

Objects of warp and weft winding, Different types of packages involved, Types of winding (precession & non precession)

Features of warp and weft winding machine. (anti patterning device, knotters, splicers, electronic clearers, slub catchers, yarn tensioners, stop motion devices, waxing, bunch building mechanism in weft winding, unifil loom winder, different types of traverse mechanisms)

Classification of yarn faults

Package defects and their remedies

Modern developments in winding machine

Calculations related to winding (related to traverse ratio, gain, winding angle, winding speed, yarn numbering and conversions, yarn tensioners, production of machines.)

norms for winding

Module II

(10 hours)

2. WARPING

Objects of warping

Types of warping machine (direct and sectional)

Features of high speed direct and sectional warper (types of creel, stop motions, tensioners, different mechanisms at head stock)

Package defects and their remedies

Recent developments in warping machine

Calculations related to warping

Module III

(15 hours)

3. SIZING

Objects of sizing

Sizing ingredients-- their properties and functions

Preparation of size paste—formulation, cooking equipment and storing.

Tape or slasher sizing machine – general description

Different types of creel, Design of size box (shirley automatic size box, heating and temperature control, level control, immersion rollers and squeeze rollers, wet splitting)

Application of size of cotton warp (types of sizing, factors governing pick up of size)

Drying equipments (cylinder drying, hot air drying, radiation drying, cooling of warp sheet, single end sizing)

The head stock (dry splitting, sheeting roller, drag roller, different types of driving arrangements, beam pressing roller, measuring and marking motions, moisture measurement and control)

Tension on warp sheet and its control (factors governing tension, methods of measuring stretch, control of stretch, migratory behaviour of end during sizing)

Calculations related to sizing, Sizing of blended yarns, Modern developments in sizing

Module IV

(8 hours)

4. Drawing in Objects, Method of drawing in (Manual, Automation), Knotting and Gaiting.

5. Basics of weaving operation, General loom elements and mechanism.

REFERENCE BOOKS :

1. An Introduction to Warping and Winding, Dr. M. K. Talukdar
2. Industrial Practices in Yarn Winding, NCUTE
3. Warp Sizing Mechanism, Ramsbottom
4. Weaving Calculation, Sengupta
5. Sizing : Materials, Methods & Machines, D.B. Aji Gaonkar
6. Modern Preparation & Weaving Machines, A. Ormerod
7. Cotton Weaving, V. Goordev

PRACTICALS

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices
Testing of a semiconductor Diode and a Transistor. IC pins connection (Digital Multimeter should be used in testing components and devices).
2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.
3. V - I Characteristic of a semiconductor diode. Determining DC and AC resistance.
4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.
5. V - I Characteristics of npn or pnp transistor. DC Biasing and measurement of dc voltages and currents.
6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.
7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.
8. Truth Tables of logic gates.
9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.
10. Study on CMOS logic Inverter.

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.
2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.
3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).
4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.
5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.
6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.
7. Connection and measurement of power consumption of a fluorescent lamp.
8. Determination of open circuit characteristics (OCC) of DC machine.
9. Starting and speed control of a DC shunt motor.
10. Connection and testing of a single phase energy meter (unity power factor load only)
11. Study of fan motor

BCSE 9201 OOP WITH C++ LAB. (0-0-3)

(10 classes for 10 different programs)

1. Programs on concept of classes and objects.(1 class)
2. Programs using inheritance.(1 class)
3. Programs using polymorphism.(1 class)
4. Programs on use of operator overloading.(1 class)
5. Programs on use of memory management.(1 class)
6. Programs on exception handling and use of templates.(1 class)
7. Programs on File handling in C++.(1 class)
8. Design problem on stock and accounting of a small organization, railway reservation, payroll preparation and optimization problem.(3 classes)

CPTX 9201 YARN MANUFACTURE LAB. - I (0-0-3)

1. Study of flow of materials in a Blow room line.
2. Study of flow of material in a Carding Machine. Various parts of the machine and functions.
3. Study of the different parts of the Draw Frame and the Flow of materials in the machine.
4. Study of the different parts of a modern Speed Frame and the Flow of materials in the machine.
5. Study of the different parts of Ring Frame and the Flow of materials in the machine.
6. Study of the different parts of a Rotor spinning Frame and the Flow of materials in the machine.
7. To produce yarn from given roving at Ring frame.
8. To produce yarn from given sliver at Rotor
9. Study of Flow of materials and different parts of a Ring doubler.
10. Study of Reeling, Bundling and Bailing Machine.

CPTX 9202 FABRIC MANUFACTURE LAB - I (0-0-3)

1. Study of passage of yarn through winding machine and its various parts.
2. Study of mechanism of a pirn-winding machine.
3. Study of passage of yarn through a sectional warper and its different parts.
4. Study of path of warp sheet in a multi cylinder-sizing machine.
5. Study of size cooking and drying arrangement.
6. Study of operational mechanism and different parts of a plain loom.
7. Study of mechanism and different parts of an automatic loom
8. Study of dobby and Jacquard
9. Study of operation and various parts of an Air jet loom
10. Study of operation and various parts of a Rapier loom

4th Semester
CPTX 8202 TEXTILE FIBRES - II (3-0-0)

Module-I (02 hours)
Polymerisation

A detailed study of polycondensation with reference to polyamides, polyester. Polyaddition reactions viz, polyolefins and polyacrylonitrile.

Module-II (20 hours)
Production Process of Man-made Fibres

General principles of spinning: Melt, dry and wet spinning.

Cellulose Base Fibres : Viscose rayon, manufacturing of viscose rayon, manufacturing of polynosic high weight modulus fibre, cupraminium rayon, and acetate & triacetate fibres, morphological structures of these fibres. The physical and chemical properties of these fibres and their applications

Synthetic Base Fibres : Melt Spinning processes, melt extrusion, Spinning conditions such as spinneret size, rate of extrusion, spinning stretch and its effect on filament structure and properties with special reference to polyester fibres, polyamide and polypropylene fibres.

Acrylic fibres- Dry jet wet spinning. Effect of spinning variables of structure properties of gel and final fibres. High shrinkage Acrylic fibres,

Physical and Chemical properties of manmade fibres and their Comparisons :- Viscose, Polyester, Polyamide, Polypropylene, Acrylic

Basic principles and need for drawing and heat setting for synthetic fibres.

Module-III (04 hours)
Textured Yarn Technology

Importance of texturing. Different processes in textured technology. Developments of false-twist texturing machine. Principles of draw texturing and study of Draw texturing machines. Principles of air bulking and properties of air textured yarns. Texturing with the aid of solvents.

Module-IV (04 hours)

Industrial Fibres : Brief discussion on Polyurethane, Kevlar , Nomex, Glass fibre, Carbon fibre, PVA fibre, PVC fibre & others.

REFERENCE BOOKS:

1. Textile fibres, V.A. Shenai
2. Man-made fibres, Moncrief
3. Production of synthetic fibre, A. Vaidya
4. Textured Yarn Technology, Monsanto
5. Processing of Man-made Fibres, Usenko
6. Introduction to Texturisation, R.S. Gandhi

BENG 1208 - FLUID MECHANICS AND HYDRAULIC MACHINE (3-1-0)

Module – I (12 hours)

Introduction : Scope of fluid mechanics and its development as a science

Physical property of Fluid

Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.

Fluid static

Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, manometer.

Hydrostatic process on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface.

Module – II (12 hours)

Buoyancy and flotation, Archimedes' principle, stability of immersed and floating bodies, determination of metacentric height.

Fluid kinematics : Introduction, description of fluid flow, classification of fluid flow. Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity.

Fluid dynamics : Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation, Analysis of finite control volumes and its application to siphon, venturimeter, orifice meter

Module – III (6 hours)

Turbine : Classification, reaction, Impulse, outward flow, inward flow and mixed flow turbines, Francis & Kaplan turbines, Pelton wheel, Physical description and principle of operation, Governing of Turbine.

Module – IV (8 hours)

Centrifugal Pump : Principles of classification, Blade angles, Velocity triangle, efficiency, specific speed, characteristics curve.

Reciprocating Pump : Principles of working, slip, work done, effect of acceleration and frictional resistance, separation

Text Books :

1. Fluid Mechanics, A.K. Mohanty, PHI
2. Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, TMH
3. Fluid Mechanics, Modi & Seth

BENG 1201 ELECTRICAL MACHINES (3-1-0)

Module I (10 Lectures)

D.C Mechanics :

D.C Generator – construction and principle of operation, E.M.F. equation ; types of generator; no load and load characteristics; Voltage build-up of shunt

Generator; voltage regulation, Application.

D.C Motor –construction and principle of operation ; back E.M.F; torque and speed equations; characteristics and performance curves; speed control of series and shunt motors; motor starters; industrial application.

Losses and Efficiency of D.C machines.

Module II (10 Lectures)

Transformer:

Single phase – construction and principle of operation; E.M.F. equation; Phasor diagram; actual and approximate equivalent circuits; open and short circuit tests, voltage regulation; losses and efficiency.

Three Phase – Construction and principle of operation; connection of three single –phase units in wye, delta, open delta configurations; Autotransformer; conventional transformer connected as Autotransformer. Special Transformers – induction heating and high impedance and high frequency transformer.

Module III (10 Lectures)

Synchronous Machines :

Three- phase alternators – construction and principle of operation; E.M.F. equation; distribution and pitch factors; Synchronous reactance; performance of alternators on no-load and load; Phasor

diagram; voltage regulation, power calculations of turbine and hydro-generators,; synchronization of a generator.

Three-Phase Synchronous Motor- construction and principle operation; V- curves; Phasor diagram; methods of starting; applications.

Module IV (10 Lectures)

Three-Phase induction Motor- construction of slip ring and squirrel cage type induction motors; Phasor diagram and equivalent circuit; torque-slip characteristics; maximum torque calculations; open and short-circuit tests; losses and efficiency; starting of induction motors; speed control; Induction generator.

Single-Phase Induction Motor- construction and principle of operation; capacitor- start and capacitor-run motors; Universal motor; Stepper motors.

Books :

1. Electrical Machines, Drives and Power Systems, 5th edition by Theodore Wildi (Pearson) : Text.
2. Electrical Machinery by A.E. Fitzgerald and Charles Kingsley, Jr., and S.D. Umans, Tata McGraw Hill Publication.
3. Principles of Electric Machines by V.K Meheta and R. Meheta , S. Chand Publication.

CPTX 8204 YARN MANUFACTURE – II (3-1-0)

Module –1

(08 hours)

Speed Frame :

Objects of Speed Frame .Study of different parts and function of a Modern speed Frame Machine . Principles of drafting, twisting and winding in speed frame. Mechanism of package formation, Calculation relating to speed, production and efficiency of speed frames. Process parameters & evaluation. Maintenance schedules

Module –II

(20 hours)

Ring Spinning:

(14 hours)

Objects of Ring spinning machine, Study of different parts and function of a modern Ring Spinning Frame. Principles of drafting, twisting and winding in Ring frame. Study of various drafting system. Design of spindles, rings and travellers. Mechanism of package formation in Ring frame. Spinning Geometry . Forces acting on yarn and traveler during spinning. Optimisation of Ring spinning system. Calculation relating to speed, production and efficiency of Ring frame. Process parameters & evaluation. Common defects in ring spun yarn, causes and remedies. Maintenance schedules.

Post spinning :

(06 hours)

Objects of Doubling , Study of working principle and process parameters of various type doubler i.e. Ring doubler, TFO. Dry and wet doubling , Twist in double yarn, Balanced twist, Objects and Working principle of Reeling, Bundling & Baling machines.

Module –III

(16 hours)

New Spinning systems:

Rotor Spinning: - (6 Hours)

Principles & mechanism of yarn formation in Rotor Spinning System . Study of different parts & functions of Rotor Spinning Machine , Process parameters and Calculation relating to speed, production , efficiency of the rotor Spinning machine

b) Air-jet Spinning System

(04 hours)

Principles & mechanism of yarn formation in Airjet spinning machine. Study of different parts & functions of Air jet Spinning Machine , Process parameters and Calculation relating to speed, production , efficiency of the Air jet Spinning machine

c) Friction Spinning System

(04 hours)

Principles & mechanism of yarn formation in Friction spinning system. Study of the features DREF-I, DREF-II and DREF-III spinning machine , Process parameters and Calculation relating to speed, production , efficiency of the DREF machine

d) Comparison of the structure and properties

Rotor, Airjet and Dref spun yarn.

REFERENCE BOOKS: (for 3 rd & 4th Semester)

1. A practical Guide to, W. Klien
Draw frame, Speed frame & Comber, Ring Spinning (All parts)
2. The Institute of Technology, Szalowski
USE series on Textile Processing
3. Spinning in 70s, Dr. P.R.Lord
4. Recent Advances in Spinning Technology, Salhotra
5. Cotton doubling and twisting, Wakefield and Son
6. Spun Yarn Technology, Oxtoby
7. TFO, HVS Murty

BCSE 3202 RELATIONAL DATABASE MANAGEMENT SYSTEMS (3-0-0)**Module I**

(10 hours)

Database System Architecture - Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages.

Data models - Entity Relationship(ER), Mapping ER Model to Relational Model, Network .Relational and Object Oriented Data Models, Integrity Constraints and Data Manipulation Operations.

Module II

(10 hours)

Relation Query Languages, Relational Algebra, Tuple and Domain Relational Calculus, SQL and QBE.

Relational Database Design: Domain and Data dependency, Armstrong's Axioms, Normal Forms, Dependency Preservation, Lossless design, Comparison of Oracle & DB2

Module III

(8 hours)

Query Processing and Optimization: Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

Module IV

(12 hours)

Storage Strategies: Indices, B-Trees, Hashing, Transaction processing: Recovery and Concurrency Control, Locking and Timestamp based Schedulers, Multiversion and Optimistic Concurrency Control Schemes.

Advanced topics: Object-Oriented and Object Relational databases. Logical Databases, Web Databases, Distributed Databases, Data Warehouse and Data Mining.

Text Books :-

1. Elmaski & Navathe -Fundamentals of Database Systems, 4th Edition, Pearson Education
2. C.J.Date - An introduction to Database Systems, Pearson Education
3. Bipin Desai -An introduction to Database System, Galgotia Publication.

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I

(8 hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II

(10 hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB.

Motivation – Nature and Importance, Herzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III

(12 hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. **Leadership** – Leadership & Management, Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Followership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV (10 Hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives **Organizational Change** – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Case Analysis

TEXTBOOKS:

1. Keith Davis, Organizational Behaviour, McGraw – Hill.
2. K.Aswhappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS :

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.

Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

HSSM 4201 ENGINEERING ECONOMICS AND COSTING(3-0-0)

Module I (10 hours)

Present worth comparisons, Comparisons of assets with equal, unequal and infinite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 hours)

Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost – effectiveness analysis.

Module III (10 hours)

1. Horn green, C.T., Cost Accounting, Prentice Hall of India
2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996 (Chapter 2,3,4,5,7,8,9,11,12)

CPTX 8206 FABRIC MANUFACTURE - II (3-1-0)

Module – I (14 periods)

Primary motion of Plain loom

Shedding, Types of shedding mechanism

Negative tappet shedding mechanism (Principle, construction and working, shape of tappets, lift between front and back heald shafts, depth of shed, advantages and disadvantages, faults in tappet shedding mechanism), Timing of shedding. Heald staggering and Assymmetric shedding, Reversing motions, Types of shed Calculation of lift of tappet to get a required shed depth.

Picking, Types of picking mechanisms, over picking mechanism, under picking mechanism, Side lever under picking mechanism, Comparison between over pick and under pick mechanisms

Parallel pick motions, Power required for picking, Shuttle checking

Beating up mechanism

Function of reed, Types of reed, Reed count, Kinematics of sley, Sley eccentricity: its adjustment and calculation

Module – II (8 periods)

Secondary Motions and Auxiliary Motions of Plain loom

Take up motion, Types of take up motion, Working of negative take up motion

Working of positive (e.g. 5 wheel, 7 wheel, continuous) take up motion, Dividend calculations of 5 and 7 wheel take up motion, Crack prevented motion, Cloth wind up system

Let off motion, Types of let off motion, Construction and working of negative let off motion, Defects in negative let off motion, Frictional force in negative let off motion, Basic concepts of positive let off motion, Working of a positive let off motion, e.g. Bartlett, Causes of pick spacing variation Warp protector mechanism, Types of warp protector mechanism, Principle and working of loose reed and fast reed warp protector mechanism

Principle and working of side weft fork motion, Principle and working of mechanical and electrical workshop motion (Castellated bar and electrode type) Brake Mechanism and temple motions

Module – III (6 periods)

Function of dobby and jacquards, Electronic jacquards, Circular and draw box mechanism
Principle and working of Cow-burn and Peck's drop box motion, Card saving device attachment

Module – IV (Automatic Weaving Machine) (6 periods)

Features of an automatic loom, Advantage of automatic loom over non-automatic loom, Types of weft feeler mechanism (Mechanical, electrical and photo electric type), Automatic cop changing mechanism, Automatic shuttle changing mechanism, Functions of shuttle eye and selvage weft cutters

Module – V (Calculations) (3 periods)

Fabric cover calculation, Production calculations related to loom, Loom faults, Fabric defects: their causes and remedies.

Module – VI (8 periods)

Shuttleless looms.

Study of Gripper, Rapier, Water Jet & Air Jet looms, Principles of weft insertion and comparison of the systems

REFERENCE BOOKS:

1. Mechanism of Weaving, Fox
2. Principle of Weaving, Robinson and Marks
3. Weaving Mechanism, Banerjee
4. Weaving Calculation, Sengupta
5. Mechanism of Weaving Machine, J. L. Chakrabarty
6. Modern Preparation & Weaving Machines, A. Ormerod
7. Cotton Weaving, V. Goordev
8. Weaving Tablets, TAI
9. Weaving: Conversion from yarn to Fabric, P. R. Lord

PRACTICALS

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.
2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.
3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).
4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.
5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.

6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.
7. Connection and measurement of power consumption of a fluorescent lamp.
8. Determination of open circuit characteristics (OCC) of DC machine.
9. Starting and speed control of a DC shunt motor.
10. Connection and testing of a single phase energy meter (unity power factor load only)
11. Study of fan motor

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices
Testing of a semiconductor Diode and a Transistor. IC pins connection (Digital Multimeter should be used should be used in testing components and devices).
2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.
3. V - I Characteristic of a semiconductor diode. Determining DC and AC resistance.
4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.
5. V - I Characteristics of npn or pnp transistor. DC Biasing and measurement of dc voltages and currents.
6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.
7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.
8. Truth Tables of logic gates.
9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.
10. Study on CMOS logic Inverter.

BCSE 9202 RDBMS LAB. (0-0-3)

(10 Classes for 10 Different Programs)

1. Use of SQL syntax : Insertion, Deletion, Join, Updation using SQL. (1 class)
2. Program segments in embedded SQL using C as host language to find average grade point of a student, etc.. (1 class)
3. Program for Log based data recovery technique. (1 class)
4. Program on data recovery using check point technique. (1 class)
5. Concurrency control problem using lock operations. (1 class)
6. Use of package (ORACLE) for programming approaches(2 classes)
7. Use of package (DB2) for programming approaches(2 classes)
8. Programs on JDBC/ODBC to print employee's / student's information of a particular department. (1 class)

CPTX 9203 YARN MANUFACTURE LAB. - II (0-0-3)

1. Study of different parts and flow of material in a Simplex Machine.
2. Study of building mechanism in Simplex.

3. Study of the Gearing Diagram of Simplex and calculation of Draft Constant.
4. Calculation of Spindle Speed and Twist Constant of a Speed Frame.
5. Learning of Changing C.P., T.W. & L.W. etc. in the Speed Frame.
6. Study of roller setting in Speed frame.
7. Study of different parts and flow of material in a Ring Frame .
8. Study of Building mechanism in a Ring Frame
9. Study of the Gearing Diagram of a Ring Frame and calculation of Draft Constant.
10. Calculation of Spindle Speed and Twist Constant of a Ring Frame.
11. Learning of Changing C.P , T.W, Ratchet wheel , cam of a Ring Frame
12. Study of roller setting and Spindle gauging and Lappet centering of a Ring Frame
13. Study of different parts of Rotor Spinning Frame.
14. Study of gearing diagram of a Rotor Frame and calculation of C.P,T.W .
15. Study of different parts of a Ring Doubler
16. Study of different parts of Reeling, Bundling, Baling M/c.
17. Producing a yarn from a given roving/sliver in Ring Frame/ Rotor Frame

CPTX 9204 FABRIC MANUFACTURE LAB.- II (0-0-3)

1. Passage of warp through a plain powerloom.
2. Study of working of negative tappet shedding mechanism with reversing motion.
3. To obtain the shape of tappet for plain and twill weaves.
4. Study of working of cone over pick mechanism.
5. Study of working of cone under pick mechanism.
6. Study of working of side lever under pick mechanism.
7. Study of movement of crank arm and beat up mechanism.
8. Study of timing circle of a plain powerloom.
9. Study of working of five wheel take up mechanism and calculation of dividend.
10. Study of working of seven wheel take up mechanism and calculation of dividend.
11. Study of negative let off motion.
12. Study of loose reed warp protector mechanism.
13. Study of fast reed warp protector mechanism.
14. Study of side weft fork motion.
15. Study of mechanical warp stop motion.
16. Study of 4 x 1 drop box mechanism and preparation of pattern card.
17. Study of automatic cop changing mechanism with mechanical weft feeler.
18. Study of driving and brake mechanism of plain power loom.

**COURSE STRUCTURE
THIRD YEAR B.TECH PROGRAMME
TEXTILE ENGINEERING**

5th Semester			6th Semester		
<i>Theory</i>	<i>ContactHrs.</i>	<i>Credit</i>	<i>Theory</i>	<i>ContactHrs.</i>	<i>Credit</i>
	L-T-P			L-T-P	
HSSM 4301 Optimisation in Engineering	3-0-0	3	HSSM 4302 Production & Operation Management or CPTX 8304 Textile Chemical Processing-II	3-0-0	3
CPTX 8301 Textile Chemical Processing-I or CPTX 8302 Fabric Structure & Design Analysis-I	3-1-0	4	CPTX 8305 Fabric Structure & Design Analysis-II	3-1-0	4
PETX 8301 Testing of Textile Material-I	3-0-0	3	CPTX 8306 Testing of Textile Material-II	3-0-0	3
PETX 8302 Statistical Quality Control & Quality Management	3-0-0	3	Elective-I (any one) PETX 8304 Process Control in Yarn Manufacture	3-0-0	3
CPTX 8303 Knitting Technology	3-0-0	3	PETX 8305 Process Control in Fabric Manufacture		
			PETX 8306 Process Control in Wet Processing		
			CPTX 8307 Technical Textiles		3
Total		20	Total		20
<i>Practicals/Sessionals</i>	<i>Contact Hrs.</i>	<i>Credit</i>	<i>Practicals/Sessionals</i>	<i>ContactHrs.</i>	<i>Credit</i>
CPTX 9301 Textile Chemical Processing Lab-I	0-0-3	2	CPTX 9304 Textile Chemical Processing Lab-II	0-0-3	2
CPTX 9302 Fabric Structure & Design Lab-I	0-0-3	2	CPTX 9305 Fabric Structure & Design Lab -II	0-0-3	2
CPTX 9303 Testing of Textile Material Lab - I	0-0-3	2	CPTX 9306 Testing of Textile Material Lab-II	0-0-3	2
Total		6	Total		6
		26			26

L-Lecture

T-Tutorial

P-Practical

5th Semester

HSSM 4301 OPTIMIZATION IN ENGINEERING (3-0-0)

Course Objective : The course aims at acquainting the students to mathematical modeling of engineering design, operation and maintenance problems and their optimization algorithms.

Module – I

Formulation of engineering optimization problems : Decision variables, objective function and constraints. Example of typical design, operation and maintenance problems in engineering : Design of a water tank, design of a truss, design of a network (electrical, communication sewerage and water supply networks), product mix problem, transportation and assignment problems, shift scheduling of employees, design of reliable devices, design of reactors, shortest route problem, set covering problem, traveling salesman problems. Only physical problems and their mathematical models to be discussed.

(6 hours)

Classical Optimization methods : Unconstrained local and global optimum for functions of single variable. Concave and Convex functions, Necessary and sufficient conditions of optimum, Extension to functions of several variables, Hessian matrix, and its relations to minimum (maximum) of a function, Quadratic forms, Minimum (maximum) of a concave (convex) function in a convex feasible region.

(3 hours)

Linear Programming Problem : Formulation, Graphical solution, Simplex method, Duality theory, Dual simplex method, Formulation and solution of engineering problems of planning and scheduling.

(4 hours)

Module – II

Sensitivity Analysis, Transportation Problem, Assignment Problem, Network Models : Minimal Spanning Tree Problem, Maximal Flow Problem, Shortest Route Problem, Minimum Cost Flow Problem. Algorithms and applications to be covered.

(10 hours)

Module – III

Integer Linear Programming Problem. Branch and Bound and Cutting Plane Methods. Zero-one Programming Problem, Knapsack Problem, Set covering Problem, Knapsack Problem, Set Partitioning Problem, Traveling Salesman Problem. Deterministic Dynamic Programming Problems. Applications and algorithms to be discussed.

(10 hours)

Module – IV

Single Variable Unconstrained Minimization Problems : (1) Region elimination method : Fibonacci Method, Golden Section method. (2) Point Estimation Method : Successive quadratic estimation method, (3) Gradient Based Methods : Newton – Raphson Method, Bisection method.

Multiple Variable Unconstrained Optimization Algorithms (1) Direct Search Methods : Evolutionary optimization, Simplex search methods, Hookes – Jeeves Pattern Search Method (2) Gradient – based Methods : Steepest descent method, Conjugate gradient method, Variable metric method.

Constrained Optimization Algorithm : Kuhn – Tucker Conditions, Penalty function Method, Lagrangian Multiplier Method, Frank – Wolfe Method. Feasible Direction Method, Generalized Reduced Gradient Method. Geometric Programming Methods.

(12 hours)

References :

1. H. A. Taha – Operations Research, Prentice Hall of India, 2004.
2. K. Deb., Optimization in Engineering Design, Prentice Hall of India, 2003.
3. D. T. Phillips, A Ravindran and J.J. Solaberg, Principles of Operation Research, John Wiley and Sons

CPTX 8301 TEXTILE CHEMICAL PROCESSING –I (3-1-0)

Module-I

(8 hours)

Dry preparatory process: Mending, Stamping, Shearing and cropping. Different methods of singeing (Plate, Roller and Gas Singeing).

Natural and added impurities in textiles and their removal (Mainly Wool & Cotton). Details of desizing and scouring of cotton fabric; Scouring of wool, degumming of Silk, Different bleaching agents, Bleaching of cotton, silk, wool, and man-made textile by suitable bleaching agents; souring process.

Module-II

(18 hours)

Preparatory processing machinery - Batch, Semi-continuous and continuous process with special reference to jigger, kier and J-Box system; Hydroextractor, Drying processes of textile materials (Hot air stenter, cylinder dryer and infrared dryer).

Module-III

(16 hours)

Mercerisation of cotton textiles; Chain and Chain-less mercerisation process.

Classification of Dyes; Properties of dyes; Theory and procedure of dyeing natural fibres (Cotton, Silk and Wool) by Direct, Reactive, Vat, Azoic, Sulphur and Acid Dyes.

Module-VI

(3 hours)

Principles and application of optical brightening and blueing agents.

Books for References:

1. Textile Chemistry, Part-I & II : R.H. Peters, Elsevier
2. Chemical Technology of Scouring and Bleaching: E. R. Trotman, Griffin.
3. Handbook of Bleaching: V.A. Shenai, Sevak Publication,
4. Technology of Dyeing : V.A. Shenai , Sevak Publication.
5. Handbook of Fibre Science & Technology Vol-I, M. Lewin
6. Chemical Technology of Fibrous Materials: K. Sadov, Matetsky & Korchagin. Mir Publisher.
7. Dyeing & Chemical Technology of Textile Fibres : E. R. Trotman,
8. Chemistry of Dyes and Principle of Dyeing : V.A. Shenai , Sevak Publication

CPTX 8302 FABRIC STRUCTURE AND DESIGN ANALYSIS- I (3-1-0)

Module-I

(10 hours)

Introduction to FSDA .

Different types of fabrics e.g. woven, knitted and non-woven, representation of fabric structure, use of point paper, repeat of weave, draft, lifting plan.

Plain Weaves and It's Derivatives

Plain, warp rib, weft rib, Matt, Fancy Matt, Repp their design, drafting and lifting. Application of these weaves in fabrics. Ornamentation of plain weave.

Module-II

(10 hours)

Twill Weaves and It's Derivatives

Standard Twill weaves, Derivatives of twill weaves like, wavy twill, rearranged twill, Herring bone twill, Combined twill, Broken twill, Ornamented twill, Angle of twill, Prominency of twill lines, Construction of Diamond and Cork Screw weaves, Drafting and lifting of above weaves.

Module-III (16 hours)

Crepe, Honey Combs, Brighton Honeycombs, Mock Leno & Huck-a-Buck Weaves and their drafting and lifting. Application of above weaves in fabric.

Compound Weaves

Module-IV (5 hours)

Textile Design and Colour

Light and colour phenomena, colours in combination, application of colour. Colour and weave combination, stripe colour and weave effects, check colour and weave effects, special colour and weave effects, Figured colour and weave effects.

Books for References:

1. Design of Woven Fabrics: MIR Publsihers
2. Grammar of Textile Design: H. Nisbet
3. Textile Design: W.S Murphy (Abhisek Publications)
4. Textile Design & Colour: Watson

PETX 8301 TESTING OF TEXTILE MATERIAL-I (3-0-0)

Module- I (4 hours)

Introduction to textile testing ,Moisture in textiles - Relative and absolute humidity and standard testing atmosphere; Moisture content and regain and their measurements; Relative humidity curve for different textile materials, Moisture hysteresis, absorption ratio.

Module-II (12 hours)

Fibre Dimension: Fibre length and distribution; Methods of measurements of fibre length Definition of fibre fineness, Technical significance of fibre fineness, Principles and methods of measurements of fibre fineness by gravimetric, optical, airflow and vibroscope methods. Maturity of cotton – it's definition and methods of measurement. Study of HVI and AFIS. Trash Content and methods of its measurement.

Module- III (4 hours)

Definition of different terms stress, strain, tenacity, breaking length, elastic limit, Modules, Creep, Crimp as applied to textile materials. Measurement of fibre strength single and bundle. Working of Stelometer and Pressley Tester.

Module- IV (10 hours)

Yarn dimension: Yarn linear density-direct and indirect system; Conversion from one system to another, Measurement of yarn count, linear density of plied and cable structure, Yarn diameter and packing density. Yarn twist – it's type and it's relation with yarn strength (Both continuous and staple), it's measurement technique.

Books for References:

1. Principle of Textile Testing: J.E. Booth
2. Textile Mathematics, Vol-I, II, III : J. E. Booth
3. Physical Properties of Textile Fibres: W.E. Morton & J.W.S. Hearle
4. Textile Testing- Angapan

PETX 8302 STATISTICAL QUALITY CONTROL & QUALITY MANAGEMENT (3-0-0)

Module – I (2 hours)

Definition of quality, product, customers, product features, customer needs, Conformance to specification and to requirements.

Module – II (10 hours)

Statistical Quality Control:

Test of significance t-test, f-test, process control and product control/process control, charts for variables and control charts for attributes for constant and varying sample sizes, cumulative sum control charts. Product Control - Acceptance sampling inspection plans - O.C. curve single and double attribute sample plans, sequential and multiple attribute sampling plans, special attribute sampling procedures. Acceptance sampling by variables. Sampling and inspection procedure for jute product.

Module – III (10 hours)

Quality Assurance:-

Concept, audit of quality plans, Planning & performing audits, quality surveys, product auditing.

Total Quality Management :-

Concept, creating quality by design, quality control of the purchase, quality control of the manufacturing quality control for sales, organising for effective quality management, human factors in quality management, quality circle.

Module –IV (8 hours)

ISO 9000 & IS 14000 concept and its study:

Quality Systems - Model for quality assurance in design / development production, installation and servicing; Model for quality assurance in production and installation; Model for quality assurance in final inspection and test, quality management and quality system elements-guidelines. Accreditation procedure.

Books for References :

1. Practical Statistics for the Textile Industry , Part – I & II – GAV Leaf
2. Statistical Quality Control – Mahajan
3. Principle of Textile Testing - J.E. Booth

CPTX 8303 KNITTING TECHNOLOGY (3-0-0)

Module-I (10 hours)

Introduction to Knitting: Difference between woven and knitted products and process. Classification of knitting mechanisms, terms and definitions used in knitting. Elements of knitting: needles, sinker and cam.

Raw Material

Module-II (12 hours)

Weft Knitting

Float & Tuck Stiches

Module-III (9 hours)

Derivatives of Weft Knit Structures

Ornamentation of plain and rib structure. Derivatives of plain: La coste, Satin, Accordion fabrics, Fair Isle, Weft lock knit, plaiting, Lace Stitched fabric, High pile fabric, Knitted hopsack, Ropple effect, Grain Effect, Seersucker effect.

Derivative of Rib: Half cardigan, Full cardigan, Milano Rib. Ornamentation of Interlock Structure. Derivative of Interlock: Eight lock, single pique, Ponte-di-Roma, Ottoman Rib

Module-IV

(12 hours)

Knitting Calculations & Quality Control

Production calculation, knitted fabric relaxation and shrinkage, values of K_c , K_w & K_s , Calculation of Areal density, Fub width, Fractional cover, Tightness factor and mass per running meter.

Control of yarn tension during knitting, knitted fabric defects.

Warp Knitting

Comparison between warp knits, weft knits and woven, Basic warp knit structures : over lap, under lap, closed lap, open lap. Knitting cycle in Tricot Knitting machine and Raschel knitting machine, Five Basic overlap, under lap variations, some warp knitted structures like, loop raised, satin, lock knit, two bar tricot, reverse lock nit, shark skin, queens cord, Open Atlas, Closed Atlas, etc.

Book Recommended :

1. Knitting Technology: D. J. Spencer
2. Knitting Technology: D. B. Ajgaonkar
3. Knitting Technology: NCUTE
4. Textile Mathematics: J. E. Booth, Vol-3

PRACTICALS

CPTX 9301 TEXTILE CHEMICAL PROCESSING LAB- I (0-0-3)

1. Desizing, and Scouring of Cotton yarn / Fabric.
2. Bleaching of Cotton yarn / Fabric with Bleaching powder.
3. Bleaching of Cotton yarn / Fabric with Hydrogen Peroxide.
4. Mercerisation of Cotton yarn / fabric.
5. Degumming of Silk
6. Scouring and Bleaching of Wool.
7. Dyeing of cotton yarn/fabric by Direct, Reactive, Vat, Azoic and Sulphur Dyes.
8. Measurement of fastness properties to washing, light ,rubbing of Cotton yarn/ Fabric each dyed with aforesaid dyes.
9. Dyeing of Wool yarn / fabric.
10. Dyeing of Silk yarn / fabric

CPTX 9302 FABRIC STRUCTURE AND DESIGN ANALYSIS LAB-I (0-0-3)

Analysis of the following Cloths in respect to fabric parameters and design with drafting and lifting plan :

Plain, Matt, Twill, Satin/Sateen, Honey Comb, Huck-a-back, Muck-Leno, Bedford Cord, Welt, Extra Warp and Extra Weft.

CPTX 9303 TESTING OF TEXTILE MATERIAL LAB -I (0-0-3)

Fibre Testing

1. To calculate the moisture regain and moisture content of a given Cotton sample by hot air oven method.
2. To trace the Fibre length-cumulative frequency percentage by means of sorter diagram.

3. To measure the Maturity co-efficient of Cotton fibre by caustire method.
4. To measure the fineness of a given sample by ATIRA FINENESS tester.
5. To measure the Bundle Strength of cotton fibre by Stelometer.
6. To calculate Trash Content % of a given Cotton sample by the TRASH ANALYSER.
7. To study the LVL (Only Demonstration)
8. To identify the unknown fibre by burning, touching, observing the corss-section .
9. To find the % of blend composition of different variety of fabrics by chemical method.

Yarn Testing

10. To determine the hank of a Drawing sliver and Roving by using physical balance
11. To determine the count of a by using physical balance.
12. To determine the Count and CSP by using Knowle's balance and lea strength tester
13. To measure the TPI of given yarn sample using Twist Tester.

6th Semester

HSSM 4302 PRODUCTION AND OPERATIONS MANAGEMENT (3 - 0 - 0)

Objective : This course aims at acquainting all engineering graduates irrespective of their specializations the basic issues and tools of managing production and operation functions of an organization.

Module I

1. Operation Function in an Organization, Manufacturing Vrs Service Operation, System view of Operations, Strategic Role of Operations, Operations Strategies for Competitive Advantages, Operations Quality and Productivity Focus, Meeting Global Challenges of Production and Operations Imperatives. (3 hours)
2. Designing Products, Services and Processes New Product Design : Product Life Cycle, Product Development Process, Product Quality and Reliability Design, Process Technology : Project , Jobshop, Batch, Assembly Line, Continuous Manufacturing, Process Technology Life Cycle, Process Technology Trends; FMS, CIM, CAD, CAM, GT, Design for Services, Services Process Technology, Services Automation. Value Engineering, Standardization, Make or buy Decision. (4 hours)
3. Job Design and Work Measurement, Method Study : Techniques of Analysis, recording, improvement and standardization. Work Measurement : Work Measurement Principles using Stopwatch Time Study, Predetermined Motion Time Standards and Work Sampling, Standard Time Estimation. (4 hours)

Module II

4. **Location and Layout Planning :** Factor Influencing Plant and Warehouse Locations, Impact of Location on cost and revenues. Facility Location Procedure and Models : Qualitative Models, Breakeven Analysis, Single Facility, Location Model, Multi-facility Location Model, Mini max Location, Total and Partial Covering Model.
Layout Planning : Layout Types : Process Layout, Product Layout, Fixed Position Layout Planning, Systematic Layout Planning, Group Technology and Cell Formation, Rank Order Clustering Method for Machine –Component Assignment,. **Line Balancing :** Basic concepts, General Procedure, Rank Positional Weight Method. (7 hours)
5. **Forecasting :** Principles and Method, Moving Average, Double Moving Average, Exponential Smoothing, Double Exponential Smoothing, Winter's Method for Seasonal Demand, Forecasting Error Analysis.

Module III

6. **Manufacturing Planning and Control :** The Framework and Components : Aggregate Planning, Master Production Scheduling, Rough-cut-Capacity Planning, Material Requirements Planning, Capacity Requirements Planning, Shop Order System and Purchase Order System. Transportation Method for Aggregate Production Planning, Material Requirement Planning, Scheduling and Dispatching Functions, Progress Monitoring and Control. (4 hours)
7. **Sequencing and Scheduling :** Single Machine Sequencing : Basics and Performance Evaluation Criteria, Methods for Minimizing Mean Flow Time, Parallel Machines : Minimization of Makespan, Flowshop sequencing : 2 and 3 machine cases : Johnson's Rule and CDS heuristic. Jobshop Scheduling : Priority dispatching Rules.

8. Inventory Control : Relevant Costs, Basic EOQ Model, Model with Quantity discount, Economic Batch Quantity, Periodic and Continuous Review Systems for Stochastic Systems, Safety Stock, Reorder Point and Order Quantity Calculations. ABC Analysis.

(4 hours)

Module - IV

9. **Project Management** : Project Management through PERT / CPM. Network Construction, CPM, Network Calculation, Crashing of Project Network, Project Scheduling with Limited Resources. Line of Balance.

(5 hours)

10. **Modern Trends in Manufacturing** : Just in Time (JIT) System; Shop Floor Control By Kanbans, Total Quality Management, Total Productive Maintenance, ISO 9000, Quality Circle, Kaizen, Poke Yoke, Supply Chain Management

(6 hours)

Reference :

1. J. L. Riggs : Production Systems : planning Analysis and Control, John Wiley.
2. E. E Adam and R. J. Ebert “ Production and Operation Management”, Prentice Hall of India, 2004.
3. S.N. Chary, “ Production and Operations Management”, Tata McGraw Hill.
4. R. Paneerselvam, “Production and Operation Management, Prentice Hall of India, 2005.

CPTX 8304 TEXTILE CHEMICAL PROCESSING-II (3-1-0)

Module-I

(10 hours)

Pigment dyeing on cotton fabric; Dyeing of polyester fabric using disperse dye by HT&HP, Carrier and Thermosol processes; Dyeing of cationic dyeable polyester fabric; dyeing of P/C and P/W blended fabrics with suitable dyes; Dyeing of Nylon with acid and disperse dyes; dyeing of acrylic with basic dyes.

Module-II

(8 hours)

Dyeing Machinery: Winch, Jet, Beam, Hank and Package Dyeing machine. Latest development in dyeing machineries.

Module-III

(12 hours)

Printing : Object of Printing, Difference between dyeing and printing, ingredients of printing paste.

Different styles of printing : Direct, Discharge and Resist.

Different method of printing : Block printing, Screen printing, Roller printing and Rotary Screen printing, Transfer printing. Printing of cotton, Silk, Polyester and Acrylic with suitable dyes.

Module-IV

(15 hours)

Finishing : Importance of finishing and their classification .

Mechanical finish : Calendaring and working principle of different calendaring machine; Sanforizing.

Chemical finish : Softening and stiff finishing, Resin finish, water proof and water repellent finish; flame retardant and fire proof finish; Moth proof finish; Soil release finish; ortgandi finish; carbonization , Biopolishing and Stonewash finish. Objects and method of heat setting, weighting of silk and scroop finishing

Books for References

1. Dyeing & Chemical Technology of Textile Fibres : E. R. Trotman,
2. Technology of Dyeing : V.A. Shenai , Sevak Publication.

3. Chemistry of the Textiles Industry: C. M. Carr
4. Textile Printing: L.W.C. Miles
5. Technology of Textile Printing: R. S. Prayog
6. An Introduction of Textile Finishing: J. T. Marsh
7. Technology of Textile Finishing: V. A. Shenai

CPTX 8305 FABRIC STRUCTURE AND DESIGN ANALYSIS – II (3-1-0)

Module-I **(8 hours)**

Pile fabric : Method of production of Terry pile, Three pick, four and five pick terry pile design; production of warp pile fabrics on the face-to-face principle; velveteen fabric design with cross sectional view (Plain & Twill based).

Module-II **(10 hours)**

Cross weaving : Gauge and Leno; Cellular gauge, Net Leno; Principle of weaving of leno fabric, Doup heald.

Module-III **(12 hours)**

Backed and Double Cloth : Warp and Weft backed design, Different types of stitching of double cloth - self stitch, centre-stitch and stitched by thread interchanging, etc. wadding effect. Ply cloth (3 ply structure); Treble cloth, Double Width Cloth, Tubular Cloth.

Module-IV **(10 hours)**

Jacquard Design : Factors affecting jacquard design, arrangement of figures in jacquard design, Damask Fabrics, Brocade Fabrics, Principle of Developing design for Tapestry and Quilts.

Module-V **(5 hours)**

Advantages of using CAD, Features of any soft mase for woven designs, CAD for Dobby and Jacquard.

Books for References

1. Design of Woven Fabric: MIR Publisher
2. Grammar of Textile Design: H. Nisbet
3. Textile Design: W. S. Murphy (Abhisek Publications)
4. Advanced Textile Design: Watson
5. Textile Design & Colour: Watson

CPTX 8306 TESTING OF TEXTILE MATERIAL-II (3-0-0)

Module-I **(15 hours)**

Yarn Irregularity – Various types , limit of irregularity, irregularity index, causes of irregularity, B (L) and V-L curves, spectrograms, effects of doubling on irregularity, irregularity testers, capacitance type, photoelectric type. Calculations to yarn irregularity. Definitions of yarn hairiness. ASTM yarn grading. Uster Classimat faults.

Module-II **(12 hours)**

Mechanical properties of Textiles : Characterisation of mechanical behaviour of textiles; stress strain curve; mechanics of CRT, CRE & CRL type testers and their comparisons, Measurement of Mechanical Properties of Textiles; Pendulum lever type testers; Ballistic Tester; Electronic strength testers; Effect of testing time and test length on strength of textile materials.

Module-III **(10 hours)**

Dimension and physical properties of fabrics. Measurements of different dimensions properties like thickness, weight, shrinkage, air permeability, water permeability, crimp, stiffness, crease recovery, drape, fabric cover and fabric handle.

Module-IV

(8 hours)

Fabric strength testing, Tensile strength, Tearing strength, Bursting strength of cloth. Determination of abrasion resistance and pilling. Calculations related to fabric dimension and properties.

Books for References :

1. Principle of Textile Testing: J.E. Booth
2. Textile Mathematics, Vol-I, II, III : J. E. Booth
3. Textile Yarn: B. C. Goswami
4. Physical Methods of Investigating Textiles: Meredith and Hearle

PETX 8304 PROCESS CONTROL IN YARN MANUFACTURING (3-0-0)

Module-I

(15 hours)

Importance of Process Control in Spinning, Methods for controlling mixing quality in respect fibre properties and cost through linear programming,

Improving of Productivity and Controlling of waste in Preparatory Spinning : Controlling the factors influencing productivity in Blow Room, Carding and Comber. Cleaning efficiency. Reduction of nep generation. Minimization of waste generation. Improving Sliver Evenness in Draw Frame. Improving Roving Evenness. Quality control check up and comparison with norms. Standard process parameters for different range of products.

Module-II

(10 hours)

Means to Improve Yarn Productivity : Measurement of Productivity, Analysis of shortfalls in productivity and profitability, Maximizing Ring Frame efficiency. Controlling end breakage rate- causes and remedies, Controlling of soft waste and hard waste generation.

Module-III

(10 hours)

Control of Yarn Quality: Controlling factors responsible for count variation and lea strength. Types of yarn faults and package defects, causes and remedies. Judging yarn appearance. Measurement and control of yarn unevenness and imperfections. Yarn fault analysis by Uster Classimat / Classifault Systems. Standard process parameters for different counts.

Module - IV

(10 hours)

Roll of Management Information Service (MIS) in Process Control: Concept of MIS and it's implementation. Yarn realization, documentation, clean cotton cost and increasing spindle utilization. Controlling the humidification. Maintenance management and energy audit system.

Books for References

1. Process Control in Spinning : ATIRA Publication.
2. Standard Norms Published by ATIRA,BTRA,SITRA,NITRA
3. Journals & Publications.

PETX 8305 PROCESS CONTROL IN FABRIC MANUFACTURE (3-0-0)

Module-I

(10 hours)

Process Control in Winding : Scope of process control, control of quality of knot, removal of yarn faults, package defects, performance in winding, control of productivity, calculation of expected efficiency of an Autocover.

Control of Tension level, Relative humidity and temperature, Performance in warping, quality of warping beams, causes of low productivity.

Module-II (12 hours)

Process Control in Sizing : Choice of size recipe and preparation, control of size pick-up, control of yarn stretch in Drying, Splitting and winding zones, Measurement of stretch, Control of moisture in sized yarns, quality of sized beam, Improvement of weavability of sized yarns, expected efficiency in sizing, Direct control of size losses.

Module-III (8 hours)

Process Control in Pirn Winding : Minimising End breaks, stoppages due to mechanical failure, Improving build of pirn, control of speed and efficiency.

Process Control in Drawing-in and Tying : Care in use and selection of healds and reeds; Drop Pins, Care in Drawing-in and Warp tying.

Module-IV (15 hours)

Control of Productivity in Loom Shed : Control of Loom Speed, efficiency and stoppages, quality of yarn, loom performance, expected loom efficiency of Automatic Looms, Fabric defects, their causes and remedies, Grey Fabric Inspection.

Control of Hard Waste and Consumption of Accessories : Control of waste in winding, warping, sizing and drawing-in, pirn winding and look ahead. Selection and care of accessories.

Books for References

1. Process Control in Weaving: Palliwal, ATIRA Publication.
2. Standard Norms Published by ATIRA, BTRA, SITRA, NITRA
3. Journals & Publications.

PETX 8306 PROCESS CONTROL IN WET PROCESSING (3-0-0)

Module - I (10 hours)

Definition of Process Control and Quality Control. Need for Quality control in textile wet processing. Flow charts indicating Process control and Quality control tests to be carried out in Desizing, Scouring, Bleaching, Souring, Mercerizing, Dyeing, Printing and finishing. Identification and estimation of residual starch. Determination of weight loss during Desizing and Scouring. Estimation of Residual Wax content & total wax content by Soxhlet extraction method. Estimation of Copper number. Determination of Cuprammonium fluidity. Determination of acid groups by methylene blue absorption method. Absorbency tests by Drop test method and wicks method.

Module-II (10 hours)

Determination of ash content. Determination of Whiteness and Whiteness retention. Determination of Barium Activity number. Shrinkage of fabric – Determination of Light fastness by Xenon Arc lamp. Determination of fastness to Washing, Dry and Wet Rubbing, Alkaline and Acidic, Perspiration. Determination fastness to Dry cleaning and sublimation.

Module-III (10 hours)

Determination of efficiency of Water Proofing. Determination of efficiency of flame Proofing. Determination of efficiency of Starching by Bending length method. Determination of efficiency of Resin finishing by Cra. Estimation of residual formaldehyde present in resin finished fabric. Evaluation of efficiency of wetting agent by Sinking Time method. Evaluation of dispersing agent. Evaluation of efficiency of detergents by Foam stability test. Identification of various fibres like Cotton, Viscose, Polyester, Wool, Acrylic and Nylon. Quantitative and Qualitative analysis of mixtures of blends like P/C, P/V, Acrylic/Cotton, Cotton/Viscose/Wool and Nylon/Acrylic/Cotton.

Module - IV

(10 hours)

Estimation of purity of dyes by Dyeing Trails and by using spectrophotometer. Concept of Computer colour Matching. Advantages of Computer Colour Matching System and its limitations. Working principle of Computer Colour Matching. Estimation of purity of Sodium Hydrosulphite, Sodium Nitrate, Sodium Silicate. Estimation of strength of Hydrogen Peroxide. Estimation of available Chlorine in Hypochlorite solution. Identification of dyes on Cellulosic fibre. Protein fibre and synthetic fibre.

Module-V

(5 hours)

Necessity of eco-friendly processing. Concept of Eco-Friendly processing. The German Ban. List of banned Amines and Chemicals. Alternatives. Eco-labeling. A brief idea of paper, gas chromatography. Tolerance limits of chemicals and auxiliaries in the export fabrics. Possible sources of contamination of red listed chemicals. ISO 14000 certification. Brief mention about the instruments used for measuring the various eco-parameters.

Books for References :

1. Technology of Textile Processing, Vol-8: V. A. Shenai
2. Evaluation of Textile Chemicals, Edn.e,1980: V.A. Shenai
3. ISI Handbook of Textile Testing, 1982: ISI, New Delhi
4. Chemical Processing of Synthetic and Blends: A. A. Vaidya and Datye (John Wiley and Sons, New York)

CPTX 8307 TECHNICAL TEXTILES (3-0-0)

Module – I

(12 hours)

High Tech. Fibres : Carbon fibres-Aramid and related fibres., Glass Threads: Manufacture of glass filaments and staple fibre - manufacture of staple fibre yarn properties and application of filament and staple fibre yarns.

Asbestos Thread : Manufacturing process-properties and applications of asbestos yarn.

Sewing Threads : Properties-manufacture of cotton, viscose, polyester, nylon and polypropylene threads.

Module - II

(12 hours)

Tyre Cords and Fabrics : Requirements of tyre cord-suitability of various fibres-polyester and Nylon tyre cords-manufacture of tyre cords-Physical and mechanical property requirements for tyre cord fabrics-Fabrics Design-Specifications. Rubberized textiles.

Belts : Conveyor belts-physical and mechanical properties-construction of belts-manufacture of conveyor belts-Power transmission belts.

Hose : Construction and applications

Filter Fabrics : General consideration of filtration of solids from liquids from gases. Solids from solids, liquid from liquids, liquids from gases and gases from gases.

Non-Woven in Filtration: Filtration in paper, cotton textile industry and viscose manufacturing industry-cigarette filters.

Module – III

(12 hours)

Functional Fabrics : Fire protection-thermal and electrical insulation-base cloth commonly used-materials-coating techniques-Waterproof fabrics-Gauze fabrics.

Medical Textiles: Surgical Textiles-Suture threads. Cardio Vascular Textiles-Knitted cardiac biological valves. Dialyze Textiles-Hollow fibres as dialysis membrane. Hospital Textiles-operating and post operating clothing-disposable drapes. Sanitary applications.

Module – IV

(8 hours)

Geo Textiles: Geo Textile functions-raw material-woven, non woven and knitted geo textile-Application of geo textiles for drainage application, separation application, soil reinforcement and filtration and erosion control.

Books for References :

1. Technical Textile - NCUTE Publication
2. Wellingtonsears Industrial Textile - Sabit Aggnur.
3. Technical Textile - Horrax and Anand.

PRACTICALS

CPTX 9304 TEXTILE CHEMICAL PROCESSING LAB-II (0-0-3)

1. Dyeing of Polyester yarn/ fabric with Disperse Dye
2. Dyeing of Nylon yarn/fabric with Acid Dye.
3. Dyeing of Acrylic yarn/fabric with Basic Dye
4. Dyeing of blended fabric with various dyes
5. Dyeing of Cotton and Silk Yarn / Fabric by Tie and Dye method .
6. Direct style of printing on cotton and silk fabric by suitable dyes.
7. Resist style of printing on cotton fabric by using mechanical and chemical resisting agents.
8. Discharge printing of cotton fabric.
9. Determination of the dyeing strength by spectrophotometer using Computer Colour matching
10. Determination of the change in fabric dimension on wet processing.

CPTX 9305 FABRIC STRUCTURE AND DESIGN ANALYSIS LAB-II (0-0-3)

1. Analysis of the following Cloths in respect to fabric parameters and design with drafting and lifting plan :
2. Terry pile, Backed fabric, Jacquard designed
3. Study of Knitted Structure (Both warp and weft knit)
4. To learn and do the card punching for jacquard design
5. Design formation by using CAD

Each student has to produce at least 4 designs

CPTX 9306 TESTING OF TEXTILE MATERIA LAB- II (0-0-3)

YARN TESTING

1. To measure the single yarn strength and elongation % at break of a given yarn by using Single Yarn Strength Tester
2. To learn the testing procedure to measure the single yarn strength by INSTRON (Only Demonstration)
3. To learn the testing procedure to measure U % and imperfection by KET. (Only Demonstration)
4. To learn the yarn gradation using ASTM yarn Board .

FABRIC TESTING

5. To find out the cover factor and GSM of a given fabric sample .
6. To find the tensile strength and tearing strength of given fabric sample
7. To find the tearing strength of given fabric sample
8. To find the abrasion resistance of a fabric by Martindale Abrasion Tester
9. To find the crease recovery, Flexural rigidity and bending length of a given fabric Sample.
10. To find the drape and thickness of a given fabric sample.
11. To learn the testing procedure of ZWICK tester. (Only Demonstration)
12. To measure the dimensional stability of a given fabric sample.

**COURSE STRUCTURE
THIRD YEAR B.TECH PROGRAMME
TEXTILE ENGINEERING**

7th Semester				8th Semester			
<i>Theory</i>	<i>ContactHrs.</i>	<i>Credit</i>		<i>Theory</i>	<i>ContactHrs.</i>	<i>Credit</i>	
	L-T-P					L-T-P	
HSSM 4403 Environmental Engineering	3-0-0	3		HSSM 4404 Marketing Management	3-0-0	3	
CPTX 8401 Structure & Properties of Yarn and Fabrics		3-1-0		CPTX 8403 Entrepreneurial Development	3-1-0	4	
CPTX 8402 Garment Manufacturing Tech.	3-0-0	3		CPTX 8404 Textile Mill, Planning Safety & Environment	3-1-0	4	
PETX 8401 Manufacture of Speciality Yarn		3-0-0	3	Electives (Any one)	3-0-0	3	
PETX 8402 Advanced Yarn Manufacturing		3-0-0	3	PETX 8406 Eco-friendly Processing of Textile			
PETX 8403 Textured Yarn Technology		3-0-0	3	PETX 8407 Advance Chemical Processing			
Electives (Any one)		3-0-0	3	PETX 8408 Advanced Production Technology of Man-made Fibres			
PETX 8404 Advanced Fabric Manufacture				Electives (Any one)	3-0-0	3	
PETX 8405 Non Woven & Functional Textiles				PETX 8409 Garment Design			
Total			16	PETX 8410 Garment Dyeing & Finishing			
				Total			17
<i>Practicals/Sessionals</i>	<i>ContactHrs.</i>	<i>Credit</i>		<i>Practicals/Sessionals</i>	<i>ContactHrs.</i>	<i>Credit</i>	
CPTX 9401 Project		5		CPTX 9404 Project		5	
CPTX 9402 Garment Manufacturing Lab.	0-0-3	2		CPTX 9405 Seminar		1	
CPTX 9403 *Industrial Internship & Seminar	0-0-3	2		CPTX 9406 Entrepreneurship Project	0-0-3	2	
Total			9	CPTX 9407 Comp. Viva Voce		2	
				Total			10
			25				27
*Student will go training in industry / service sector for one to one & half months as per the time schedule fixed by the Institute.							

L-Lecture

T-Tutorial

P-Practical

CPTX8401 STRUCTURE AND PROPERTIES OF YARN AND FABRIC

Module-I

Yarn diameter and count, specific volume, packing of the fibres in Yarn, packing fraction of yarn Basic geometry of, idealized helical yarn structure, yarn count and twist factor, twist contraction and retraction, experimental values of contraction.

Module-II

Fibre migration in yarn - Mathematical way of representation of ideal migration, Mechanics of migration. Morton's and other's view of fibre immigration in yarn structure

Module-III

Simple analysis of tensile behaviour of continuous filament. Yarn for small extension without and with considering lateral contraction. Effect of twist on yarn strength and fabric quality. Theory of breakage of continuous and spun yarn, weak link effect.

Module-IV

Study of the yarn structure of non-conventional spun yarn such as Rotor, Dref, Air-jet spun yarn and their comparison with universal Ring spun Yarn.

Module-V

Woven cloth setting theories, elements of woven fabric geometry, cover factor, ends, and picks, count, crimp and weight relationship of similar fabrics. Pierce simple geometry of plain weave, derivation of basic equations considering different conditions of warp & weft yarn. Kemp's race track theory, practical application of cloth geometry, crimp interchange.

Books for Reference:

- 1) Structural Mechanics of Fibres, yarns and fabrics: J.W.S. Hearle, P. Grosberg & S. Backer.
- 2) Textile Yarns: B. C. Goswami, J. G. Martindale & F. L. Sardino
- 3) Woven Cloth Construction : Robinson & Mark
- 4) Cloth Geometry: F. T. Pierce

CPTX8402 GARMENT MANUFACTURING TECHNOLOGY

Module- I

1. Classification of Garment – Men, Women & Children. Body measurement – standard measurement tables for children, teenagers, gents, ladies etc. Principle of Apparel construction - Study of the sequences of involved in garment manufacturing, various machines, equipment and tools used in clothing construction. Fabric selection: selection of fabric according to dress style in respect to different age groups, fashion, climatic condition, religion, culture etc.

Module - II

Pattern making – Objectives, Methods of pattern making – drafting, draping and flat pattern.

Pattern lay out for different type of fabrics- Border design fabrics, check fabric, Diagonal woven design/printed fabric, stripes fabric, pile fabric, knitted fabric etc.

Module – III

Cutting- Objectives , Different types of cutting equipment, Marker plan and layout.

Spreading in single ,double or multi-widths. Understanding of various fabrics, & its effect on spreading & cutting techniques

Tracing & marking terminology – Chalked marking, chalked thread, colour coding, pin marking, tailors tacks, thread tracing.

Module - IV

Sewing Machine- its parts,working,defects,care and maintenance.

Classification of different type of basic stitches – different type of hand stitches and machine stitches and their use.

Classification of different types of basic seams, their characteristics and uses.

Sewing needles, their characteristics and uses. Sewing thread and their relation with needles.

Various type of feeding mechanism and sewing beds.

Module – V

Pressing equipment, Trimming, Lining, Interlining, Fusing Technology.

Module – VI

Production control,scheduling and planning at every stages of garment manufacturing.

Costing of Apparel product.

Reference Books:

1. The Technology of Clothing Manufacture- Carr & Latham
2. Garment Construction – Sodhia
3. Managing productivity in the Apparel Industry- Rages Bhedia.
4. Introduction to Clothing Manufacture – Cooklin
5. Garment Manufacturing Technology – NCUTE
6. Finishing of Garment and knits - NCUTE

PETX8401 MANUFACTURE OF SPECIALITY YARN

Module – I

1. Long Staple Spinning:

Principle ,working and process parameters of spinning system for yarn formation from long staple fibres and their blends. Such as woollen , worsted, spun silk , flax and jute spinning system.

Module – II

2. Tow to sliver formation and bulked Acrylic yarn production

Module-III

3. Siro Spinning - Principle and mechanism of yarn formation.

4. Core Spinning - Principle and mechanism of formation of core-spun yarn on various spinning system.

Module-IV

5. Production of Fancy yarn – Methods of producing slub yarn- Drawn-and-spun yarn,
Methods of producing fancy yarns on conventional Ring doubler
Methods of producing fancy yarn on specialized folding machine- Knop yarn, Snarle yarn, Loop yarn, Spiral yarn etc.
6. Methods of producing mélange yarn.

Module V

- 7.. Study of the mechanism of the formation of Self-twisted yarn, Twist less yarn, Semi-molten polymer-core yarns. Bobtex yarn, Wrap-spun yarn.

Reference Books:

1. Spun Yarn Technology – ERIC OXTOBY
2. Textile Yarn- Goswami., Martindle, Scardino
3. New Spinning Technology – W. Klien

PETX8402 ADVANCED YARN MANUFACTURING

Module – I

1. Modern Development in Blow Room line. Study of principles in designing modern beater, opener and blenders. Design of feed regulating mechanism, cone drives, PIV gears, setting of pressure switch and photo shell. Design of Auto-lap doffing mechanism, study of impulse and digital counter, limit switch, proximity switch.

Module – II

2. Study of the significance of the modern development in the design of feeding, opening, carding, and doffing region in a high production card . Geometry of metallic card clothing wires used in licker-in, cylinder, flat and doffer , Inertia of carding Engine,

Module – III

3. Theories of drafting mechanism - Design of drafting rollers, roller diameter, flute design, roller weighting in a modern drafting system in Draw Frame.. Principle of Auto leveler in carding and draw frame.

Module-IV

4. Design of flyer, Design of differential motion used in speed frame. Design of Building mechanism in a modern Speed frame.

Module - V

5. Design of different parts of modern comber. Design of half lap unicombe, ipper knife, Nipper plate, Top comb, etc. Forward and Backward feeding system. Design of spindle and bolster, ring, travelers etc. in Ring frame.

Module VI

6. Theory of spinning balloon and yarn tension in ring frame. Arrangement of drafting rollers and Geometry of spinning zone. Design of cam and follower in ring frame. Optimum package size. Improvement in design of high speed ring frame. Compact Spinning

7. Study of the development in design of opening rollers, rotor, naval etc. in rotor spinning frame.

Module - VII

8. Study of TFO and its merits and demerits over ring doubler.

Reference Books

1. Manual of Cotton Spinning Vol. 1,2,3,4 and 5.,Textile Institute

PETX8403 TEXTURED YARN TECHNOLOGY

Module-I

Concepts of Texturising: Purpose - Types of texturised yarns - Classification of process, Mechanics of texturisation, physical and mechanical properties of texturised filament yarn structure and geometry of texturised yarns - Application of texturised yarns, role of spin finish on texturised yarns.

Module-II

Basic Concepts in the Manufacture of Stretch, Modified Stretch and Bulk Yarns: Basic concepts of Helanca process, false twist, edge crimping, stuffer box gear crimping, knit-de-knit, Turbo-due-twist and air jet texturising (Principles only).

Module-III

False Twist Texturising : Principle, Single heater and double heater false twist texturing machines, Twisting elements, Factors influencing Twist- Properties of Textured yarn, Effect of feed material and process variables.

Module-IV

Draw Texturising: – Sequence of draw texturising process - working principle of draw texturising machine.

Friction Texturising : Principles-Baltex unit, Ring tex unit – mechanism of heating – zone length and speed – Texturised yarn properties and defects.

Air Jet Texturising : Principle - air Jet nozzle types, process variables, yarn properties.

Module-V

Texturising Cellulosic, P/C Blends and Polypropylene : Principles - methods of texturing cellulosic materials, Slack mercerization, Sheath core technique, Thermoplasticization, Crystallisation and decrystallisation, Texturising of blended polyester and viscose rayon.

Module- VI

Textured Yarns Quality parameters and their control.

Books Recommended

1. Textile Yarns Technology and Applications: Goswami B. C., Martindale J. G. and Scardino F. L., John Wiley & sons, New York 1977
2. Texturised Yarn Technology, Vol. I, II, III., Monsanto Publications 1967

3.Modern Method of Yarn Production: G. R. Wray, Cloumbine Press 1960

4.Textile Progress Vol. 1, 1976.

5.Textured Yarns, Ed., Gandhi R. S. MANTRA, Surat.

PETX8404 ADVANCED FABRIC MANUFACTURE

MODULE-I

Mechanics of winding and tension variation in winding. Winding parameters, uniform build of conical packages. Design and operation of modern winding machine, Design of grooved drum for conical packages, package density analysis of yarn tension. Different yarn clearing system.

MODULE-II

Principle, design and operation of modern warping and sizing machine. Theory and design principle of latest automatic control in sizing machine. Cone angle and raverse in sectional warping. Design of sow box in sizing machine. Tension control during unwinding, sow box, drying and beaming. Wet splitting, automation for uniform add-on and stretch. Pirn build and sloughing.

MODULE-III

Principles governing the design of looms. Mechanics of weaving operation. Kinematics of sley, heald motion, shed depth diagram. Shedding cam design. Mathematical treatment of picking, picking cam design. Checking of shuttle, friction and impactal checking wih swell. Velocity of shuttle during acceleration and retardation. Picking force and study of slay eccentricity. Causes of picle variation by beating up force, stress relaxation let-off and take-off mechanism. Design problems of conventional looms.

MODULE-IV

Principle underlying in design of non-conventional weaving machinery ,. Kinematics of weft propulsion in non-conventional looms.

REFERENCE BOOKS:

1. Principle of weaving Marks
2. Journals.

PETX8405 NON WOVEN & FUNCTIONAL TEXTILES

MODULE-I

Classification of non-woven fabrics. types of fibres used and end uses, Methods of web preparation,methods of bonding of web, production, stitch bonding, spun bonding, thermal bonding.

MODULE-II

Production of non-woven fabrics by needle punching machine, characteristics of various types of needle punched structure. Developments in needle punching machines

MODULE-III

Production of no-woven fabric by Adhesive bonding, Characteristics of adhesive bonded fabrics in relation to adhesive properties and method of its application.

MODULE-IV

Development in production technologies for spun bonded non-woven fabrics.

Production, characteristics and uses of melt blown fabrics.

MODULE - V

Raw material characteristics and their effect on fabric properties. Relationships between structural geometry of various types of nonwoven fabrics and their properties.

MODULE -VI

Wet laid fabrics, their structure and properties.

REFERENCE BOOKS:

1. Manuals of Non-woven – Crema
2. Non-woven Bonded Fabrics – J.Lunenschloos & W.Albrechet
3. Industrial Application of Textiles – Textile Progress
4. Design of Textiles for Industrial Application – P.W.Harrison
5. Non-Woven Textile – NCUTE Publication.

CPTX 9401 PROJECT

Students will choose any one project carry out

CPTX9402 GARMENT MANUFACTURING LABORATORY

CPTX9403 INDUSTRIAL INTERNSHIP & SEMINAR

8th Semester

CPTX 8404 TEXTILE MILL PLANNING, SAFETY AND CONTROL

MODULE-I

TEXTILE MILL PLANNING AND ORGANISATION

Management and departmental organization of textile mill. Production and Product mix planning and scheduling. Costing and cost analysis. Economic analysis, productivity and efficiency, classification and standardization of products and materials.

Plant services: Humidifications, Ventilation and lighting. Utilisation of steam and power. Energy and effluent problems.

Material handling and safety in Textile Mills – Methods and equipment employed.

Selections and classification of workers – work load and adjoinment, wages and incentives.

Labour law and factory law applicable to textile mills.

Labour allocation in different department of a textile mill. Workload standards for card enters, speed frames and ring tenters, winders, doffers, weavers, etc. in terms of tripartite agreements and labour laws.

Preparation of financial statements, capital and running cost, profit and loss. Account, Break even analysis, etc. Determination of cost of production of yarn and fabric (cost studies).

Raising Finance, Enterprise Lanching.

Taxation: Income Tax, Excise Duty, Sales tax.

CPTX 8403 ENTREPRENEURIAL DEVELOPMENT

1. Characteristics of Entrepreneur & Training: Entrepreneurship -Meaning-Characteristics –function of Entrepreneur- innovations –Risk taking, Management of Business-Training & Development-Entrepreneur Development programme-Schemes etc.

2. Project Formulation and Finance to Entrepreneur : Identification of Business opportunities- Project ideas & Identification through Trade Fair, Exhibition, Agencies-Finance to Entrepreneur-Institutions& Banks-Agencies- Role of agency – Incentives & subsidies.

3. Selection of Project: Factors to consider for selection of a project – Technology, Marketing, Labour, Location, Equipment-Project formulation, Identification- Trade fair & Exhibition-Feasibility report-Contents-Small Scale Industry –Promotion-Pricing policy-Object of Prices- Profit Theory.

4. Basic Knowledge of Business Organisation & Economics: Factors of production-Land, Labour, Capital, Enterprise,-Form of Business Organisation-Types-Sole traders, partnership, Joint Hindu family, company, co-operatives, Law of marginal utility, demand curve, Demand schedule, Elasticity of demand, Supply – Law of supply.

5. Business regulation : Law of contract, Essential Element of contract-Sale of contract, Sale of goods, -Sale & Agreement to sell, -Contract of Agency-Classification Agency-Termination-Insurance-Tax—Procedure for Registration.

Reference Books:

1. Entrepreneurial Development, P.Saravanel
2. Business Organisation- Bhusan Y.K
3. Principle of Economics – M.C.Seth
4. Organisation and Management of Small Scale Industries-Vasanth Desai.

PETX 8406 ECO-FRIENDLY PROCESSING OF TEXTILE

MODULE-I

ECO-FRIENDLY TEXTILES

1.CONCEPT OF ECO-FRIENDLY PROCESSING: Introduction need for eco-friendly processing, European Eco-standards, Eco labeling and eco trade marks. List of Toxic substances used in textile processing, Precautions to be taken, European ban, Action of GOI and other organizations. Eco auditing, Eco testing, ISO 14000 concepts and certification, Banned amines and safe dyes. Pollution capacity of chemicals in processing.

2.PRODUCTION OF ECO-FRIENDLY TEXTILES: Norms for the toxic chemicals such as formaldehyde, pesticides, Pentachlorophenol, Heavy metals, Carcinogenic amines, Halogen carriers, Chlorine. Norms for baby clothing and adult clothings, Eco friendly chemicals, Use of Glucose based reducing agents, natural dyes and safe alternatives for hazardous chemicals.

3.TESTING OF ECO-PARAMETERS: European criteria for eco testing, test for free formaldehyde content, chlorinated components in textiles, source of contamination , AOX values, testing for chlorinated components, pesticides, Heavy metals and azo dyes.

4.EQUIPMENT FOR ECO-TESTING: HPLC, HPTLC, GC, MSB, AAS, AES, Plasma Emission Spectroscopy, Spectro photo meter, Detectors in GC such as FID, ECD, TCD, PND, TID, FPD, PID.

5.ECO-MANAGEMENT: Ecology policy statement, Responsibility and authority, Management representatives, Systematic review of orders, Purchase policy, assessment of suppliers, Preparation of specification for raw material and accessories, verification system, eco auditing, product line audit, site audit, eco controlling, ecological status analysis, ecological declaration.

REFERENCE BOOKS:

1. BTRA, seminar on Eco Textiles, Book of papers 1996
2. Eco friendly textiles: Challenges to the textiles industries, Textiles Committee

PETX8407 ADVANCE CHEMICAL PROCESSING

Module-I

Advances in preparatory processing of natural and man-made fibres such as jute, cotton, wool, silk, polyester, polyamide, acrylic, etc. and their blends. Developments in batch and continuous open width processes and machinery for preparatory processes. Developments in mercerizing process and machinery. Preparatory process and machinery for knitted fabrics. Use of optical brightener, UV-absorber and speciality auxiliaries in textile processing. Speciality preparatory processes for jute, wool, silk, textiles and their blends.

Module-II

Advances in finishing processes of natural and man-made fibres such as Jute. Viscose, Cotton, Wool, silk, Polyester, Polyamide, etc. and their blends. Speciality finishing process for jute, wool and silk textiles and their blends. Recent developments in functional finishes like antcrease, antishrink, water repellent, water proof, flame retardant, soil release, antistatic, etc. mechanism, processes and evaluations. Common defects in preparatory and finishing processes. Their causes and remedial measures. Process and quality control in preparatory and finishing processes. Norms for productivity and utility consumption in chemical processing. Chemical analysis of surfactant and finishing chemicals. Developments in finishing machinery. Characterisation of common textile auxiliaries and finishing chemicals.

Module-III

Biotechnology in Textile Processing with special reference to use of enzymes for specific purpose like biopolishing, denim washing etc. Coated and laminated textiles.

Module-IV 04

Textile effluent – sources, general characteristics, specification and their significance. Basic concept of primary, secondary and tertiary treatments for an ETP.

Module-V

Energy conservation by process optimization and modifications as well as by adoption of new technology viz. combined/single stage process, low liquor and low add on techniques, foam processing, microprocessor based control systems, etc. Water conservation in Textile Processing.

Books Recommended

1. Hand Book of Fibre Science & Technology Series, Vol.1 Fundamental of Chemical Preparation, Ed. M. Lewin & S. B. Shello., Marcel & Dekker, NY.
2. Hand Book of Fibre Science & Technology Series, Vol.II: Functional Finishes, Part A & B: Ed. M. Lewin & S. B. Shello, Marcel & Dekker, NY.
3. Textile Auxiliaries & Finishing Chemicals: A. Vaidya et al, ATIRA
4. Textile Chemistry, Part I & II: R. H. Peters, Elsevier
5. Chemical Technology of Fibrous Materials: K. Sadov, Matatsky & Korchagin, Mir Pub.
6. Chemical Technology of Scouring & Bleaching: E. R. Trotman, Griffing.
7. Chemical after Treatment of Textiles: H. Mark, N.S. Wooding & S. M. Atlas, Willey Inter Sc. NY.

PETX8408 ADVANCED PRODUCTION TECHNOLOGY OF MAN-MADE FIBRES

Module-I

Laws of viscous and non-Newtonian flow: Capillary flow behaviour. Melt and solution viscosity and factors affecting viscosity of fibrous polymers, Review of theories of flow of fluids for Newtonian and Non-Newtonian fluids. Flow behaviour of non-Newtonian viscoelastic fluids: it's rheology and important factors for controlling their flow. Flow through spinnerate: die-swell and melt fracture. Design of spinnerate and extruders in relation to flow of melt or solution of fibrous polymers.

Module-II

Review of fundamental steps and technology for melt, wet and dry spinning. Developments in production technology of common synthetic fibres. Other fibre spinning processes – like gel spinning, liquid crystal spinning by dry-jet wet spinning technique etc. High speed spinning and spin-draw process. Super drawing. Advances in spinning equipments and take-up unit for aspun/POY filaments. Process variables in melt, wet and dry spinning and their controls. Methods of mass-colouration or dope dyeing.

Module-III

Review of common post-spinning operations and development therein in drawing, twisting, heat setting, steaming, spin finish formulation and application techniques, crimping and stapling etc. Factors influencing those post-spinning operations and structure – property development with varying process variables and their control. Tow-to-staple conversion: pacific converter and turbo stapler etc. Draw-warping – machinery and process variables.

Module-V

Defects in synthetic fibres and plant problems during spinning: heir causes and remedial measures. Process and quality control measures in man-made fibre plants.

Module-VI

Production of fibres of different cross-sections like round, triangular, octalobal, hollow, etc. Production of Bicomponent fibres and microdenier fibres: their properties and specialities. Production of fancy filament yarns and production of HDPE and PP tapes.

Module-VII

Recovery and utilization of synthetic fibre waste.

Books Recommended

- 1.Man made Fibre Technology: H.F. Mark, S.M. Atlas & E.Cernia, Vol.1-3, Intersscience
- 2.Man Made Fibre: R. W. Moncrief, 6th Ed. Newners Butter Worth.
- 3.Modern Yarn Production: Wray
- 4.A Guide to Crimping/Texturing: A. B. Talele & R.S.Gandhi, Mantra
- 5.Synthetic Fibre Production: A. A. Vaidya, Prentice Hall
- 6.Manufactured Fibre Technology: V. B. Gupta & V. K. Kothari, Champman & Hall.
- 7.Fundamental of Fibre Formation: Ziabicki-Willey
- 8.Bulked Yarn: Piller
- 9.Fibre chemistry (Hand Book of Fibre Sc. & Tech. Vol-IV), Ed. M. Lewin & E. M. Pearce, Marcel & Decker, NY.
- 10.High Tech. fibres (Part A & B): Ed. M. Lewin & E. M. Pearce, Marcel & Decker, NY.

PETX 8409 GARMENT DESIGN

Module -I

Introduction to elements of design.

Lines	Classification, types, effects, optical illusions Vertical, Horizontal, Diagonal, Curved.
Shapes	Classification, Regular, Irregular, Equal sided, Unequal sided, compositions.
Forms	Types, different form and silhouettes.

Colours : Introduction to colours, colour systems, primary and Secondary, Warm and cool colours, Tints and shades, Colour schemes, Analogues, Monochromatic, Contrasting – Complimentary, Split Complimentary, Double complimentary, Triad complimentary, Neutral colours and colour neutralization, Rainbow colours, Psychological effects of colours

Textures : Different types of textures, Blowing – thread pressing – marble – Drop of water, Butterfly – Stencil spray – Dry brushing – Blade, Crayon – threads rolling – fevicol or rubber solution

Module - II

Study of human anatomy: Normal and proportionate figure Characteristics of normal and abnormal figure.

Study of 8 head theory- its importance and application.

10 head theory for fashion drawing –its characteristics and uses.

Module-III

Cloque figure drawing in ½ Imperial sheet front, back, front leg apart. Preparation block sleeve straight and half bending.

Drawing Human figures with the help of Blocks, Sketch out the difference between normal and fashion figure, Sketch cloque figure with pencil in different posture.

Module-IV

Study of different types of fold, gather, drape of fabric and shading them with different mediums.

Sketching of different types of garments, summer wear, casual wear etc with black pen, water colour or any medium.

Module – V

Selection of line, fabric, colour, design, style etc. for infant & children, women, men, Teenagers.

Study of fabric designing for women in stripes, for men in checks, for children in baby prints

Reference Books:

1. Ireland Patric Jone- Fashion Design ,Drawing and Presentation,B.T.Batslord,1994..
2. Fashion Designing and Illustration- Tarnpenny Jhon .M
3. Drake,Nicholas- Fashion Illustration Today- Thamesis Hudson, London 1995.
4. Art of everyday life-Goldstrain & Goldstain (Micamillan Co., New York)
5. The art of sewing – Anna Jacob Thomas
6. The artist's guide to mixing colours- Jenny Rodwell
7. Hand book of illustration – John Rowland Wood (Design Press, New Yourk).

PETX 8410 GARMENT DYEING AND FINISHING

Module -I

Garment Dyeing, garment dyed items – knitted and woven, sequence of wet processing of cotton garments. Dyeing processes, Requirement of dye system and fastness properties. Different dye systems. Dyeing Machinaries – paddle, rotary drum and tray dyeing machine. Sequence of wet processing of woolen and silk garments. Dye processes and machinaries.

Module –II

Printing – Introduction, Preparation of cloth required for printing, Different methods and styles of Printing. Different ingredients used in printing pastes and their functions.

Module -III

Finishing – Different types of finishing; temporary, permanent, chemical, mechanical, etc. different chemical used and their functions. Water proof, water repellent finish, flame proof, Moth, Mildew, proofing, foam finishing. Garment finishing, stone and sand washing,

Module-IV

Care of Clothing – Suitable techniques for removal of stains on clothing (due to coffee, tea, curry, blood, oil, ink, mildew, paints, rust, etc. Techniques of Dry cleaning for clothing of different textile fibre, Equipment in laundering. Use of washing machine. Indigenous Laundering agent and their uses.

REFERENCE BOOKS:

- | | | | |
|----|---|-------|-------------|
| 1. | Dyeing and Chemical Technology of Textile Fibres
Trotman | E. | R. |
| 2. | Textile Scouring and Bleaching | E. R. | Trotman |
| 3. | Technology of Bleaching | V. A. | Shenai |
| 4. | Technology of Dyeing | V. A. | Shenai |
| 5. | A Glimpses on the Chemical Technology of Textile
Fibres | R. R. | Chakravorty |
| 6. | Textile Finishing | S.J. | Hall |
| 7. | Principles of Cotton Printing | D.G. | Kale |
| 8. | An Introduction to Textile Finishing | J. T. | Marsh |

CPTX 9404 PROJECT

CPTX 9405 SEMINAR

CPTX 9406 ENTREPRENEURSHIP PROJECT

CPTX 9407 COMP. VIVA VOCE